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GEOPHYSICS, ASTRONOMY AND SPACE
No. 392

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GEOPHYSICS, ASTRONOMY AND SPACE

No. 392

This serial publication contains abstracts of articles from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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I. ASTRONOMY

Abstracts of Scientific Articles

VARIATIONS OF EARTH'S ROTATION

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian, No 1, 1977, 1A19

[Article by V. N. Plakhotnyuk and S. M. Mansurov; Tbilisi, SIMPOZ. KAPG PO SOLNECHNO-ZEMN. FIZ., Part I, TEZISY DOKL., 1976, pp 35-37, "Variations in the Earth's Rotation and the Interplanetary Magnetic Field"]

[Text] This paper is a discussion of the mechanisms of excitation and attenuation of the wanderings of the earth's instantaneous pole and irregular variations of its diurnal rotation and also their cause-and-effect relationship to variations of the geomagnetic field. The detected patterns combine a complex of phenomena in the rotating system plasmosphere-atmosphere-ocean-crust-mantle-fluid core into a self-consistent converter of geomagnetic field variations. Bibliography of eight items.

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NONUNIFORMITY OF EARTH'S DIURNAL ROTATION

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1A18

[Article by Yu. D. Kalinin and V. M. Kiselev; Tbilisi, SIMPOZ. KAPG PO SOLNECHNO-ZEMN. FIZ., 1976, Part 1, TEZISY DOKL., 1976, p 34, "Interplanetary Magnetic Field and Nonuniformity of the Earth's Diurnal Rotation"]

[Text] The correlation analysis method was used in investigating the correlation between solar activity and changes in the rate of the earth's diurnal rotation and seismic activity and with secular changes in geomagnetic moment (mean annual values are used). The authors have found the statistically significant correlation coefficients for different time shifts between the parameters to be correlated. A study was made of the

correlation between the sectoral structure of the interplanetary magnetic field (IMF) and the nonuniformity of the earth's diurnal rotation $\delta\omega/\omega$. The authors used 210 pairs of monthly values of the investigated parameters for April 1957-September 1974. As a characteristic of the sectoral structure of the IMF the authors took the ratio K of the number of days with a negative direction of the IMF to the number of days with a positive direction of the IMF. After excluding the seasonal and sectoral variations $\delta\omega/\omega$ it was possible to find the correlation coefficients $r(K, \delta\omega/\omega) = +0.77$ with a shift $\Delta T = +5$ months. The mean annual K values and $\delta\omega/\omega$ (1926-1973) were used in finding $r(K, \delta\omega/\omega) = +0.83$. It is possible that the terrestrial hydromagnetic dynamo operates for the most part due to the solar energy which is continuously received in the magnetosphere from the solar wind by means of a reconnection of the magnetic lines of force.

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STRUCTURE OF SOLAR RADIO BURSTS

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1A131

[Article by S. T. Akin'yan, S. A. Amiantov, A. A. Gnezdilov, A. M. Karachun, V. A. Kovalev, O. S. Korolev, A. K. Markeyev, V. V. Fomichev, G. P. Chernov, I. M. Chertok; Moscow, FIZ. SOLNECHN. AKTIVNOSTI, "Nauka," 1976, pp 64-80, "Fine Structure of Solar Radio Bursts in July 1974"]

[Text] On the basis of observations made at the Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation the authors analyze the fine structure of the time profiles and dynamic spectra of solar meteor radio bursts in July 1974. It was possible to establish an antiphase of intensity and degree of polarization in quasiregular variations with time scales of tens of seconds and minutes. It was possible to register U-bursts and also type-III bursts consisting of discrete narrow-band elements. Phenomena were observed in which the polarized radiation of a "zebra structure" is associated with type-III bursts. The article gives the characteristics of microstructure, concentrated in pulsations of type-IV radio bursts. The dynamic spectra of a series of type-V bursts revealed radiation in the first and second harmonics. Bibliography of 18 items.

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RADIO EMISSION OF PROTON REGION

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1A134

[Article by A. F. Bachurin, A. S. Dvoryashin and N. N. Yeryushev; Tbilisi, SIMPOZ. KAPG PO SOLNECHNO-ZEMN. FIZ., 1976, Ch. I. TEZISY DOKL., 1976, pp 9-11, "Radio Emission of Proton Region on Sun in SW Part of Centimeter Range"]

[Text] The article gives the results of observations of a local radio source ($\lambda = 1.9, 2.5$ and 3.5 cm) on the sun, associated with a large group of spots, which passed across the solar disk in late June - early July 1974; it intersected the central meridian on 3 July. The intensity of radio emission, together with great burst activity, experiences strong changes with time. On 1, 4 and 5 July there were long-period changes in intensity (mean period ~ 100 minutes). There were continuous intensity fluctuations with relatively short periods. During the period of greatest flare activity of the group the values of the spectral indices of a local source decrease significantly and on 2-4 July the spectral index for $3.5-2.5$ cm assumed negative values. There were found to be brief weak bursts, during which the radiation flux density at the maximum at $\lambda = 1.9$ cm exceeded the corresponding values at 2.5 and 3.5 cm. A powerful radio burst, associated with the proton flare of 4 July, in the range $0.86-2.5$ cm had a U-shaped spectrum. The burst had two maxima; between them there were intensity fluctuations with periods ~ 30 sec and with an amplitude of $\pm 10\%$ of the mean level.

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II. METEOROLOGY

News

CREATION OF NEW METEOROLOGICAL CENTERS IN POLAND

Moscow IZVESTIYA in Russian 1 Feb 77 p 4

[TASS Report: "For the Weather Service"]

[Text] A national meteorological center has been established in Warsaw which will be closely related to similar organizations in neighboring countries. This center will become part of the world weather service.

Specialized and regional meteorological centers will begin operation in other large cities. In Krakow this center will be intended for collection of data received from artificial earth satellites. The Wroclaw center will be concerned mainly with weather service in the mountains and foothills. The Gdynia center will be for the oceanographic service. Meteorological and hydrological data will begin arriving here not only from coastal areas and the entire Baltic, but also from more than 200 Polish commercial and fishing vessels located in distant seas and oceans. [5]

PAPERS ON ATMOSPHERIC CIRCULATION AND WEATHER FORECASTING

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1B41K

[Abstract of collection of articles edited by N. I. Lisogurskiy and V. S. Kalachikova; Leningrad, ATMOSFERNAYA TSIRKULYATSIYA I PROGNOZ POGODY NA DAL'NEM VOSTOKE (Atmospheric Circulation and Weather Forecasting in the Far East), TRUDY DAL'NEVOST. N.-I. GIDROMETEOROL. IN-TA, No 57, Gidrometeoizdat, 1976, 172 pages]

[Text] Contents: G. V. Svinukhov, Ye. V. Nikolayeva and T. M. Chebotarevskaya -- "New Rules for the Rhythm of Reference Typhoons in the Far East"; V. S. Kalachikova -- "Prognostic Properties of Blocking Cyclones Over

East Asia"; R. Ya. Zhezhko -- "Types of Large Extremal Anomalies of Mean Monthly Air Temperature in Eastern Siberia and in the Far East" and "Degree of Anomalousness of Mean Monthly Air Temperature in Eastern Siberia and in the Far East in the Warm Half-Year"; T. I. Vorob'yeva -- "Anomalous Nature of Monthly Precipitation in the Warm Half-Year in the Territory of Primorskiy and Khabarovskiy Krays"; V. D. Kryukov and V. T. Lenshin -- "Operational Model for Computing the Surface Maximum of Daytime Air Temperature on the Basis of Data for Radiosonde Observations of the Atmosphere During the Nighttime"; V. T. Lenshin and T. K. Rybyanets -- "Checking Short-Range Forecasts of Zones of Atmospheric Convection and Areas of a 'Shower Situation' in the Amur Region"; N. M. Bobyleva -- "Alternative Method for Predicting Continuous Precipitation for the Primor'ye Region During the Warm Period (May-August)"; A. A. Kalendov and T. S. Lopacheva -- "Cyclogenesis Over the Far East and Adjacent Seas During the Cold Season"; L. P. Sharapova -- "Characteristics of Synoptic Processes Causing Especially Dangerous Snowfalls in Kamchatka"; N. I. Sergeyev -- "Influence of Advection on the Moisture Content of the Atmosphere Over Eastern Siberia in January and July"; V. I. Korniyenko and G. N. Tolstonogova -- "Correlation Between the Turbulent Flux of Heat at the Ocean Surface and Stratification of the Boundary Layer of the Atmosphere"; N. I. Pavlov, Ye. M. Anikeyeva and Ya. P. Yefremov -- "On the Quasi-Two-Year Cycle of Wind in the Equatorial Stratosphere"; A. K. Vipritskaya -- "Position of the Axes of Jet Streams Relative to the Tropopause"; Ye. N. Yesipova -- "Vertical Profiles of Short-Wave Radiation Balance in the Cloudless Atmosphere"; Ye. I. Tret'yakova -- "Precipitation Regime During the Displacement of Typhoons in Sakhalinskaya Oblast and the Probability of its Falling in its Territory"; G. S. Moiseyenko -- "Parameters of Rain for the Territory of Primorskiy Kray"; T. A. Tonkikh -- "Distribution of Especially Dangerous Rains in the Territory of Primorskiy Kray"; V. K. Khramtsova and O. S. Kapalova -- "Maximum Depth of Penetration of a Temperature of 0° into the Soil in Primorskiy Kray"; A. V. Miko -- "Prediction of Wind Velocity at the Earth's Surface at Chita."

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Abstracts of Scientific Articles

LASER SOUNDING OF ATMOSPHERIC AEROSOL IN SURFACE LAYER

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1B117

[Article by V. Ye. Zuyev, Yu. S. Valin, B. S. Kostin, I. E. Naats and I. V. Samokhvalov; Tomsk, IV VSES. SIMPOZ. PO LAZERN. ZONDIR. ATMOSFERY. TEZISY DOKL., 1976, pp 147-150, "Some Results of Multifrequency Laser Sounding of Atmospheric Aerosol in the Surface Layer"]

[Text] This article gives the distribution functions of the geometric section of aerosol particles by sizes at different points along the sounding path for two measurements made at different temperatures. In a comparison of the cited data it is possible to evaluate the spatial variations of aerosol parameters. Bibliography of eight items.

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MICROSTRUCTURE OF STRATOSPHERIC AEROSOL

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1B120

[Article by V. Ye. Zuyev, N. V. Kozlov, E. V. Makiyenko, I. E. Naats and I. V. Samokhvalov; Tomsk, IV VSES. SIMPOZ. PO LAZERN. ZONDIR. ATMOSFERY. TEZISY DOKL., 1976, pp 160-162, "Evaluation of the Microstructure of the Characteristics of Stratospheric Aerosol on the Basis of Data from Laser Sounding"]

[Text] The paper gives the results of a determination of the characteristics of microstructure of aerosol at altitudes 14-28 km on the basis of data from laser sounding at two frequencies. Bibliography of two items.

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LASER OBSERVATIONS IN AEROLOGICAL NETWORK

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1B92

[Article by A. I. German, V. M. Zakharov and O. K. Kostko; Moscow, TRUDY TSENTR. AEROL. OBSERV., No 117, 1976, pp 74-87, "Prospects for the Development and Use of Laser Observation Methods in the Aerological Network"]

[Text] A study was made of the possibility of using lasers in aerology. The paper presents experimental data on determination of standard meteorological parameters of the atmosphere, the characteristics of clouds, transparency, contamination and atmospheric composition. There is a discussion of the use of lasers on meteorological artificial earth satellites and the further prospects for laser observation methods. Bibliography of 38 items.

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INSTRUMENT COMPARISON DURING GATE-74 PROGRAM

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1B72

[Article by B. Kayser; Berlin, Z. METEOROL., 26, No 3, 1976, pp 152-153, "Comparison of Instrument Readings when Carrying Out GATE-74 Program"]

[Text] During July-August 1974, while carrying out investigations under the GATE program, specialists organized comparative tests of the instruments mounted on the research ships "Akademik Kurchatov" (USSR), "Alexander von Humboldt" (GDR) and "Columbus Iselin" (United States). The article presents results characterizing the difference in the readings of instruments used in measuring atmospheric pressure, temperature and humidity, wind direction and velocity and also the salinity of sea water and the temperature of the surface layer. Bibliography of five items.

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DEVELOPMENT OF AEROLOGICAL NETWORK IN USSR

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1B45

[Article by V. I. Shlyakhov; Moscow, TRUDY TSENTRAL'NOY AEROL. OBSERV., No 117, 1976, pp 22-29, "Status and Prospects for Development of the Aerological Network of the Soviet Union"]

[Text] An important element in the automation is a system for complex radiosonde observation of the atmosphere, the "Meteorit-2"-RKZ-5, replacing the earlier "Malakhit"-A-22 system. The "Meteorit-2"-RKZ-5 system makes it possible to measure temperature and pressure aloft with a satisfactory accuracy, but for the time being the situation is poorer with the measurement of humidity. In order to obtain information only on the wind specialists have developed the A-28 radar responder. Work on special sounding of the atmosphere is being carried out in the direction of an investigation of the field of long-wave and UV radiation. Also examined are some economic, technical and organizational aspects of the aerological network and information is given on new developments at the Central Aerological Observatory. Bibliography of 17 items.

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NEAR-WATER AIR LAYER IN TROPICAL ATLANTIC

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1B353

[Article by N. Z. Ariyel', R. S. Bortkovskiy and D. F. Timanovskiy; Leningrad, "TROPEKS-74. TRUDY MEZHDUVED. EKSPEDITSII PO PROGRAMME MEZHDUNAR. ATLANTICH. TROPICH. EKSPERIMENTA. T. I." ("TROPEX-74. Transactions of the Interdepartmental Expedition Under the Program of the International Atlantic Tropical Experiment. Vol I," Gidrometeoizdat, 1976, pp 431-436]

[Text] The values of the turbulent fluxes of heat, moisture and momentum computed on the basis of measurement data obtained aboard the scientific research weather ship "Ernst Krenkel" in 1974 agree well with the results obtained in 1969 and 1972. It has been established that the relative temporal variability of the parameters of the near-water layer in the tropics is considerably less than in the temperate latitudes of the North Atlantic. Data were obtained on the correlation between the Bowen ratio and water temperature in the tropical zone of the ocean. Bibliography of eight items.

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EQUATORIAL INTERACTION BETWEEN OCEAN AND ATMOSPHERE

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1B352

[Article by V. M. Radkevich and Ye. I. Seryakov; Leningrad, "TROPEKS-74. TRUDY MEZHDUVED. EKSPEDITSII PO PROGRAMME MEZHDUNAR. ATLANTICH. TROPICH. EKSPERIMENTA. T. I." ("TROPEX-74. Transactions of the Interdepartmental Expedition Under the Program of the International Atlantic Tropical Experiment. Vol I," Gidrometeoizdat, 1976, pp 417-423, "Interaction Between the Atmosphere and Ocean at the Equator")]

[Text] On the basis of standard meteorological observations aboard the scientific research vessel "Akademik Kurchatov" and a nonlinear model of the near-water layer of the atmosphere the authors have computed the turbulent fluxes of explicit and latent heat and also momentum. In a model of the near-water layer an allowance was made for the stratification associated with the specific humidity gradient. A study was made of the frequency of recurrence of different gradations of turbulent fluxes and the Bowen ratio. An investigation was also made of the day-to-day changes and characteristic diurnal variation of turbulent fluxes. The results of the computations are compared with direct measurements, computations by the use of other formulas, and also with computations by a similar method for the zone of tropical convection (using observational data for TROPEX-72). Bibliography of eight items.

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EFFECT OF MAN ON CLIMATE

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1B590

[Article by M. I. Budyko and F. F. Davitaya; Moscow, XXIII MEZHDUNAR. GEOGR. KONGR., MOSKVA, 1976, SEKTS. II, OBOSHCH. PROBL. GEOGR. I MODELIR. GEOSISTEM, 1976, pp 26-31, "Effect of Man on Climate"]

[Text] The possibilities are arising for modifying climate in the direction of a warming, determined by an increase in the production of energy and the CO₂ concentration. In many countries an active struggle is being carried out against atmospheric contamination; this is reflected in a decrease in the concentration of anthropogenic aerosol in the atmosphere. In general, an atmospheric aerosol reduces the temperature of the lower air layer. Under conditions of an increase in the concentration of CO₂ in the atmosphere and an increase in the production of energy it is necessary to monitor the change in the content of aerosol in the atmosphere. A modification of the aerosol layer in the lower stratosphere for the purpose of changing climate is possible only after a precise evaluation of the effects of such modification on atmospheric processes in all regions of the earth.

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ICE-FORMING ACTIVITY OF AEROSOL

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1B234

[Article by B. Z. Gorbunov and K. P. Kutsenogiy; Leningrad, TRUDY GLAVNOY GEOFIZICHESKOY OBSERV., "Effect of Dispersivity of Aerosols on Their Ice-Forming Activity"]

[Text] The authors examine different methods for determining the ice-forming activity of aerosols. Reliable quantitative information cannot be obtained solely on the basis of data on determination of the number of ice crystals, computed per 1 g of reagent. The ice-forming activity must be very highly dependent on the dispersivity of the aerosols. In an investigation of the ice-forming activity it is necessary to determine the size of the aerosol particles. In order to obtain information on the maximum value of the number of ice crystals computed per 1 g of reagent and on the optimum degree of dispersion it is necessary for each fog temperature to investigate the dependence of N on dispersivity in a broad range of particle sizes. Bibliography of 37 items.

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APPARATUS FOR EJECTING PULVERIZED SUBSTANCES INTO CLOUDS

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1B197

[Article by V. A. Malinin and V. I. Pavlov; Moscow, TRUDY INSTITUTA PRIKLAD. GEOFIZIKI GUGMS, No 21, 1976, pp 102-105, "Apparatus for Ejection of Pulverized Substances from Aircraft"]

[Text] The article describes a method and apparatus for the ejection of pulverized substances from an aircraft for the purpose of formation of a point source of aerosols. The use of this method leads to a decrease in the losses and expenditure of the substance per unit area of the substance-covered surface in the case of ejection from altitudes greater than 100 m. Bibliography of one item.

[276]

USE OF SATELLITES FOR STUDYING EARTH'S NATURAL RESOURCES

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1B161

[Article by N. K. Vinnichenko, V. B. Smirnitskiy and A. D. Dobrozrakov; Moscow, TRUDY TSENTRAL'NOY AEROLOGICHESKOY OBSERVATORII, No 117, pp 147-150, 1976, "Investigation of Hydrometeorological Resource Parameters from Artificial Earth Satellites"]

[Text] At the present time instrumentation is being developed for experimental satellites which will make it possible to obtain television images with a high spatial resolution in several parts of the spectrum (visible, IR, VHF). Using such a complex of instrumentation it will be possible to

obtain qualitatively new information on the earth and its atmosphere in the interests of branches of the national economy. Bibliography of three items.
[276]

AEROLOGICAL MEASUREMENTS FROM SATELLITES

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977,
1B160

[Article by A. G. Gorelik and L. A. Pakhomov; Moscow, TRUDY TSENTRAL'NOY
AEROLOGICHESKOY OBSERVATORII, No 117, 1976, pp 52-55, "Status and Prospects
of Aerological Measurements from Satellites"]

[Text] The paper discusses the results of a reconstruction of the temperature profile in the atmosphere using radiation measurements from meteorological artificial earth satellites. The accuracy of such sounding for the time being is still 2-4°. The combination of satellite and radiosonde methods for sounding the atmosphere will make possible a considerable improvement in information on the state of the atmosphere over the land, and in particular, over the oceans. Bibliography of six items.
[276]

USE OF METEOROLOGICAL SATELLITE DATA IN AEROLOGY

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977,
1B159

[Article by N. K. Vinnichenko and A. D. Dobrozkov; Moscow, TRUDY TSENTR.
AEROL. OBSERV., No 117, 1976, pp 56-59, "Use of Television Information
from Meteorological Artificial Earth Satellites for Aerological Purposes"]

[Text] A study was made of the possibilities of registering the aerological characteristics of the atmosphere using the television apparatus aboard meteorological satellites. The authors note the shortcomings of existing TV apparatus aboard artificial earth satellites of the "Meteor" type; the conclusion is drawn that matched multichannel systems are promising and the authors propose promising spectral intervals for matched television apparatus for meteorological use. Bibliography of six items.
[276]

SIX-COMPONENT MODEL OF ATMOSPHERIC GENERAL CIRCULATION

Moscow IZVESTIYA AKADEMII NAUK SSSR, FIZIKA ATMOSFERY I OKEANA in Russian
Vol 13, No 1, 1977 pp 3-12

[Article by M. B. Galin, Institute of Physics of the Atmosphere, "Investigation of Global Structure of General Circulation of the Atmosphere on the Basis of a Six-Component Model"]

[Abstract] The article describes a nonlinear quasigeostrophic baroclinic model of the atmosphere with a small number of components for a hemisphere with energy gains and losses. The system is described by six parameters and allows both a zonally symmetric and a wave regime. The author analytically constructs a precise solution in the form of a travelling wave of constant amplitude maintaining stationary zonal flows. The basic characteristics of the thermal structure of the zonal field coincide well with observations. It is shown that within the framework of the considered system a solution of the travelling wave type with a constant amplitude is an attractor for any solution with arbitrary initial data. The article gives a comparison with an adiabatic solution. The author evaluates the principal energy transformations. The computed rates of transformation of energy agree satisfactorily with observational data.

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III. OCEANOGRAPHY

News

RESEARCH SHIP "AKADEMIK KURCHATOV" BEGINS VOYAGE

Moscow PRAVDA in Russian 5 Jan 77 p 3

[Article by Ya. Levit: "Voyage of a Research Ship"]

[Text] Kaliningrad, 4 January. Yesterday the scientific research ship "Akademik Kurchatov" set out on its 24th voyage.

The chief of the expedition, Doctor of Physical and Mathematical Sciences Yu. P. Neprochnov, reported that the main purpose will be to make a comparative study of the zones of large transverse faults which intersect the Mid-Atlantic Ridge, the eastern Pacific Ocean Rise and the adjacent ocean basins. [5]

NEW CURRENT-MEASURING INSTRUMENT IN PRODUCTION

Moscow IZVESTIYA in Russian 4 Jan 77 p 2

[Article by V. Kalnin': "An Aid for Oceanologists"]

[Text] Riga. At the hydrometeorological instrument experimental plant production has begun on a new instrument -- a self-contained digital current meter. The ATsIT, as the new instrument is abbreviated, can make measurements at depths of six to ten kilometers. When it is deployed in the area under investigation it will transmit data every hour on current speed and direction, water temperature, pressure and electric conductivity. The data are received on a ship by means of a hydroacoustic channel. [4]

Abstracts of Scientific Articles

METHOD FOR TRANSMITTING DATA FROM BENEATH WATER

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1V271

[Article by Yu. A. Grodetskiy; Leningrad, PROBLEMY ARKTIKI I ANTARKTIKI, No 48, Gidrometeoizdat, 1976, pp 114-122, "Noncontact Method for Transmitting Data from Beneath the Water"]

[Text] The author examines different methods for transmitting information from beneath the water and the choice of magnetic communication is justified. The main part examines a model of the medium and cites the results of computations of the field of the transmitter. On the basis of these results the article gives an engineering evaluation of the system and practical conclusions. Bibliography of 15 items.

[276]

INVESTIGATION OF UNSTEADY INTERNAL WAVES

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1V93

[Article by S. F. Dotsenko; Sevastopol', MOR. GIDROFIZ. ISSLED., No 2(73), 1976, pp 48-60, "Unsteady Internal Waves Created by Periodically Operative Pressures"]

[Text] A study was made of the process of development of waves in an exponentially stratified, nonrotating fluid excited by periodically operating pressures. Also considered are plane and cylindrical waves created by a zone of travelling pressures. Bibliography of 14 items.

[276]

RADIATION BRIGHTNESS AT SEA IN SPECTRAL INTERVAL $8-13\mu\text{m}$

Moscow IZVESTIYA AKADEMII NAUK SSSR, FIZIKA ATMOSFERY I OKEANA in Russian
Vol 13, No 1, 1977 pp 52-60

[Article by Ye. F. Demidov, O. V. Bakusov and Yu. I. Belousov, "Radiation Brightness with Crossing of Sea Horizon in Range $8-13\mu\text{m}$ "]

[Abstract] The dependence of sea horizon thermal contrast on hydrometeorological conditions is considered on the basis of a stochastic model of sea surface roughness. The authors derive a general expression for the difference in brightness in the spectral interval $8-13\mu\text{m}$ when crossing the level of the geometrical horizon with cloud cover taken into account, as well as sea-air temperature, wind velocity and type of roughness. The results of calculations are presented in this paper for the cases of isotropic and well-developed wave formations. Experimental results are compared with calculations.

[228]

EFFECT OF TIDES ON TIDAL DEFORMATIONS OF SEA FLOOR

Moscow IZVESTIYA AKADEMII NAUK SSSR, FIZIKA ATMOSFERY I OKEANA in Russian
Vol 13, No 1, 1977 pp 72-79

[Article by B. A. Kagan and Ye. V. Polyakov, Institute of Oceanology, "On the Influence of Ocean Tides on Tidal Deformations of the Sea Floor and the Surface of the Land"]

[Abstract] This paper gives the results of computations of earth tides determined in the process of numerical solution of the problem of interaction between tides in the earth's solid body and in its water envelope. The most significant differences in earth and static tides are discovered in the high latitudes of both hemispheres and also in the central part of the Pacific Ocean and in the region adjacent to the Pacific Ocean shores of Mexico. On the continents the ratio of the amplitudes of earth and static tides varies from 0.9 to 1.1 and the difference in their phases varies from -5 to 5° . They decrease in absolute value with increasing distance from the shore, tending to their static values, but almost nowhere coincide with them. The noted peculiarities in the spatial distribution of tidal deformations of the sea floor and surface of the land are attributable to the influence of ocean tides. The mean values of the ratio of the amplitudes and phase differences of earth and static tides for the surface of the sea floor, land and the earth as a whole are found to be 0.985, 0.996, 0.991 and -0.894° , 0.524 and -0.274° respectively (the minus sign corresponds to the case of an outpacing and the plus to the case of a lagging of earth tides relative to the static tides). Thus, applicable to the entire earth the influence of ocean currents causes not a lagging, but an outpacing of earth tides.

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IV. TERRESTRIAL GEOPHYSICS

News

QUESTIONS ABOUT EARTHQUAKES ANSWERED

Moscow IZVESTIYA in Russian 10 Feb 77 p 6

[Article by A. Ivakhnov: "Year of Earthquakes?"]

[Text] How does one explain why there have been so many severe earthquakes during the past year? What is the Richter scale which is mentioned so frequently in news bulletins? Such questions are encountered in many letters from readers. We sent these questions on to the Institute of Physics of the Earth imeni O. Yu. Shmidt. In responding to these questions, Doctor of Physical and Mathematical Sciences V. Bune stated:

"Approximately 95% of all earthquakes occur in regions of the Pacific Ocean zone -- primarily beneath the ocean floor or on the land in places where there is no or almost no population. In most cases the general public knows nothing about them."

"On our Eurasian continent there are less than 1/20th of all earthquakes on the earth and for the most part they occur in unpopulated places and only specialists know about them. And if the readers of IZVESTIYA have in mind the catastrophes occurring recently in Guatemala, Italy and China, here it is necessary to speak not about an increase in the number of earthquakes (in general, these cases exerted no influence on the general global pattern), but about the number of sorrowful coincidences when the epicenters were situated near populated regions and therefore the subsurface tremors carried away human lives and led to considerable material losses."

"Still another circumstance of more than a little importance must be noted. During recent years, after the tragedies in the territories of Peru, Chile and at Skopje the interest of the community in tectonic phenomena has increased immeasurably and therefore world news agencies began to report about them more frequently, especially since modern technology

makes it possible to judge the region and energy of an earthquake occurring at virtually any point on the earth. This creates the impression among people that these phenomena are becoming more frequent.

Before discussing the intensity of an earthquake, please recall that for its evaluation in our country we have adopted a 12-unit scale: if dishes rattle on the shelf it is a four-unit tremor, if the chandelier sways it is a five-unit tremor, if cracks appear in brick walls it is a seven-unit tremor. Thus, on the basis of the scale unit it is possible to judge the effect of an earthquake on some point on the earth's surface. However, when one wants to obtain the energy characteristic of an earthquake focus one uses the Richter scale. According to this scale, the energy of the elastic waves emanating from the focus is estimated in special units -- magnitudes (sometimes they are called Richter scale units).

It is understandable that the magnitude and the focal distance from the earth's surface govern the area of the region subject to tremors of some intensity. In the case of a magnitude of six, or seven, the earthquake can occur over the area of one city and its immediate neighborhood (within this zone the earthquake intensity unit can be considerably greater), whereas in the case of a magnitude of eight, an earthquake of this intensity can affect a territory of a thousand square kilometers.

Due to new methods of research and an increase in the number of seismic stations, during recent years scientists have been able to a considerable degree to refine and make more detailed the maps of seismic activity and in the immediate future they will be sent in a new variant to the USSR Gosstroy and other organizations for practical use.

[240]

TASS REPORTS EARTHQUAKE IN TURKESTAN RANGE

Moscow PRAVDA in Russian 1 Feb 77 p 6

[TASS Report: "Underground Tremors"]

[Text] Tashkent, 31 January. Today at 2035 hours local time underground tremors of approximately force six were felt in Tashkent. At the Central Seismic Station "Tashkent" a TASS correspondent was told that according to preliminary measurements, the epicenter of the earthquake was located 210 kilometers southeast of Tashkent in the Tien Shan foothills.

There were no casualties or damage in Tashkent. [5]

EARTHQUAKE REPORTED IN TADZHIKISTAN

Moscow PRAVDA in Russian 2 Feb 77 p 6

[Article by O. Latifi: "Underground Tremors"]

[Text] Dushanbe, February 1. Yesterday evening underground tremors were felt by the inhabitants of Dushanbe. Although seismic stations in the territory of Tadzhikistan have registered more than 3,000 earthquakes in a year, there has not been one like yesterday's for a long time. Its epicenter was located in the Isfara kishlak of Oftobruy.

The underground tremors there reached force 8-7. In the neighboring cities of Kanibadam and Shurab they reached force 6-5 and in Leninabad and Nurek - force 4. At the epicenter houses were destroyed and individual agricultural buildings and administrative structures were damaged. Part of the power supply failed.

"Rescue operations went on the whole night," said first secretary of the Isfara party city committee, Umarali Kurbanov. General assistance for the population was organized immediately. Working groups from a number of communists and komsomols were created. People were evacuated from the disaster areas. Those who were left without shelter were taken in by the residents of the surrounding villages. A supply of hot food was arranged and all necessities were supplied. The enterprises and institutions of the region are operating normally. [5].

SHEBALIN COMMENTS ON RECENT TURKESTAN EARTHQUAKE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Feb 77 p 4

[Article by N. Shebalin: "At the Epicenter and Near It"]

[Excerpt] The earthquake of 31 January occurred in the northern ridges of the Turkestan Range. Its focus, where the earth layers began to move along the forming fissure, was probably about 30 kilometers in length and was located at a depth of approximately 10-30 kilometers. This is a large earthquake. The intensity of its focus (magnitude) was 6.5 units on the Richter scale. But at the surface this earthquake was force 8 on a twelve-point scale. In the north strong vibrations reached Tashkent where they were almost equal to force five (it seems to me that local seismologists somewhat overestimated the intensity). In the south the mountain ridges somewhat restrained the propagation of the vibrations and in Garm the intensity of the tremors was no greater than force five.

Earthquakes are not rare in winter. In Tadzhikistan, for example, they were observed in February, 1911, and then much later, in January 1943. But they occur more often in the spring and fall during the change in seasons.

The present earthquake is related in type to the stage in development of the earth's crust in the mountainous regions. All of this is accompanied by the upthrusting of mountains, by the appearance of new fissures and by the rejuvenation of old fissures. Up to a certain time these shifts can take place smoothly. But sometimes there are also rapid shifts of the layers deep in the earth which give rise to earthquakes.

There have been no earlier known strong earthquakes in the Isfara - Bakten region. Seismic stations have registered only weak tremors here. It is true that at times echoes of distant seismic catastrophes from the Fer-gana valley or from the mountains of Tadzhikistan have reached this area. However, this region lies within the boundaries of a dangerous zone and for us earthquakes have not been unusual in the past. Both the present operational map of seismic regionalization and the recently completed and improved map indicate the possibility of the occurrence of force 8 earthquakes in these locations. [5]

COLLECTION OF ARTICLES ON GRAVIMETRIC INSTRUMENT MAKING

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1G9K

[Abstract of collection of articles; Tula, GRAVIMETRICHESKOYE PRIBORO-STROYENIYE (Gravimetric Instrument Making), Tula Polytechnic Institute, 1975, 51 pages]

[Text] This collection of articles deals with the matter of planning and investigating gravimetric and gravi-inertial measuring instruments; it is concerned with a number of theoretical problems relating to the automation of design work and the method for processing primary information.

[276]

PAPERS ON CRUSTAL INVESTIGATIONS IN SIBERIA

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1G11K

[Abstract of collection of articles; Novosibirsk, METODIKA I REZUL'TATY KOMPLEKSNYKH GEOFIZICHESKIKH ISSLEDOVANIY ZEMNOY KORY SIBIRI (Methods and Results of Complex Geophysical Investigations of the Earth's Crust in Siberia), edited by E. E. Fotiadi, 1976, 180 pages]

[Text] This collection of papers reflects the results of scientific research work in the Division of Potential Fields of the Institute of Geology and Geophysics Siberian Department USSR Academy of Sciences during 1971-1975 on study of structure of the earth's crust and upper mantle in Siberia using a combination of geophysical methods, on study of the present-day dynamics of the earth's crust in the Baykal rift zone and on the development of gravimagnetometric and electromagnetic methods for investigating the deep structure of the earth.

[276]

MONOGRAPH ON STRUCTURE OF EARTH

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1G13K

[Abstract of monograph by I. S. Berzon and I. P. Pasechnik; Moscow, STROYENIYE ZEMLI PO DINAMICHESKIM KHARAKTERISTIKAM SEYSMICHEISKIH VOLN. ISLEDOVANIYE KORY I MANTII (Structure of the Earth According to the Dynamic Characteristics of Seismic Waves. Investigation of the Crust and Mantle), "Nauka," 1976, 236 pages]

[Text] This book contains the results of an experimental and theoretical study of the earth's crust and mantle by means of an analysis of the dynamic characteristics of seismic wave fields of different types and classes by methods developed in seismic prospecting. Also considered are models of the crust and the region of its transition to the mantle, and also a thin-layered model of the transitional zone from the lower mantle to the earth's outer core. A study was made of the role of the thin-layered structure of the upper part of the geological cross section in seismology and deep seismic sounding. Methods were developed and the authors carried out experimental evaluations of the parameters of attenuation of seismic waves in the lower and in the upper mantle. Work was carried out within the framework of international geophysical projects. Bibliography of 299 items.

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Abstracts of Scientific Articles

METHOD FOR STUDYING EARTH'S STRUCTURE AND EARTHQUAKE FOCI

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1G172

[Article by A. I. Starovoyt, A. I. Zakharova, L. S. Chepkunas and N. A. Chernobay; Minsk, ISSLED. DLINNOOPERIOD. SEYSMICH. VOLN, "Nauka i Tekhn." 1976, pp 7-22, "Use of Observations of Long-Period Seismic Instrumentation for Study of the Earth's Structure and Earthquake Foci"]

[Text] This is an analysis of materials from seismic observations made at a number of stations outfitted with long-wave instrumentation. It has been possible to determine the absorption coefficients of Rayleigh waves in the range of periods 15-250 sec and Love waves in the range 15-70 sec. On the basis of amplitude spectra of body and long-period surface waves it was possible to estimate the velocity, direction and extent of the fault of the Ust'-Kamchatskoye earthquake of 15 December 1971. Bibliography of 23 items.

[276]

METHOD FOR DETERMINING FOCAL DEPTH OF EARTHQUAKES

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1G77

[Article by V. V. Kislovskaya and N. V. Kondorskaya; Minsk, ISSLED. DLINNOOPERIOD. SEYSMICH. VOLN, "Possibility of Using the Rayleigh Surface Wave for Determining the Focal Depth of an Earthquake in Seismological Practice"]

[Text] On the basis of experimental data the authors demonstrate the effect of a more rapid attenuation of the high-frequency component in comparison with the low-frequency fundamental tone of a Rayleigh wave with an increase in the depth of an earthquake. It is shown that this property of the

Rayleigh wave can be used for determining the depth of earthquakes and some other focal parameters. Bibliography of 17 items.

[276]

NATURE OF LONG-PERIOD SEISMIC NOISE

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1G139

[Article by L. N. Rykunov, T. A. Proskuryakova, L. A. Savrina, I. I. Zhil'yayev and Ye. V. Voronina; Minsk, ISSLED. DLINNOPERIOD. SEYSMICH. VOLN, "Nauka i Tekhn.," 1976, pp 57-72, "Some Characteristics of Long-Period Seismic Noise"]

[Text] A study was made of the nature and the principal characteristics of seismic waves in the range of periods 10-80 sec registered using horizontal long-period seismographs set up at the stations "Pulkovo," "Obninsk" and "Minsk." The dominating mechanism in the generation of noise in the studied range of periods can be the effect exerted on the earth's surface by microfluctuations of atmospheric pressure causing deformation of the ground, manifested in tilts. The effect of tilts on horizontal pendulums in most cases has a random nature. The authors estimate the dimensions of the deformed sectors of ground. Bibliography of nine items.

[276]

SPECIAL CASE OF GROUPING OF SEISMIC STATIONS

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1G113

[Article by Yu. A. Kolesnikov and N. L. Trapeznikov; Minsk, ISSLED. DLINNOPERIOD. SEYSMICH. VOLN, "Nauka i Tekhn.," 1976, pp 80-88, "Group of Seismic Stations -- a 'Triangle' with Wide-Band Magnetic Digital Recording"]

[Text] The article describes a "triangle" system consisting of three seismic stations ("Talger," "Frunze," "Naryn") equipped with identical wide-band seismic apparatus with registry in a digital code on a magnetic tape. The article is accompanied by a block diagram and the technical specifications of individual units and apparatus as a whole. The article gives examples of the registry of remote earthquakes. Bibliography of seven items.

[276]

DEEP STRUCTURE OF NORTHWESTERN USSR

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1G28

[Article by T. A. Proskuryakova, Zh. P. Khot'ko and Yu. N. Kuznetsov; Minsk, ISSLED. DLINNOOPERIOD. SEYSMICH. VOLN, "Nauka i Tekhn.", 1976, pp 103-113, "Deep Structure of the Northwestern Region of the USSR Using the Results of Observations and Analysis of Long-Period Seismic Waves and Geophysical Data"]

[Text] As a result of an analysis of the dispersion of phase velocities of Rayleigh surface waves in the range of periods 10-100 sec, registered from remote earthquakes by seismic stations in Moscow, Pulkovo, Minsk (Pleshch-enitsy), Riga (Baldone) it was possible to obtain the averaged velocity cross sections and thicknesses of the earth's crust and upper mantle in the region. The seismological data were used as reference data for computations using gravimetric data on relief of the Conrad and Mohorovicic discontinuities. The geoseismic cross section is compared with the deep geo-electric cross section of the Belorussian complex. Bibliography of 12 items. [276]

PRIMARY PROCESSING OF GRAVIMETRIC DATA

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1G249

[Article by K. P. Voropayeva and O. N. Polozova; Tula, GRAVIMETRICH. PRIBOROSTROYENIYE, 1975, pp 39-42, "Primary Processing of Gravimetric Information from a Photographic Film"]

[Text] A study was made of the possibility of the office processing of gravimetric processing of information on the basis of the theory of applied information. The method for evaluating the records is given. Bibliography of four items.

[276]

CIRCUITRY OF TELECONTROLLED PENDULUM MEASURING INSTRUMENT

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1G253

[Article by G. B. Chuvikov; Tula, GRAVIMETRICH. PRIBOROSTROYENIYE, 1975, pp 35-38, "Circuitry of Pendulum Measurement Instrument with Telemetric Control"]

[Text] This article gives the circuit diagram of an automated pendulum instrument and presents a time diagram of its operation. Nominal data on the electric components included in it are given.

[276]

INTERPOLATION OF MAGNETIC AND GRAVITATIONAL ANOMALIES

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1D210

[Article by Yu. V. Antonov; Moscow, PRIKLADNAYA GEOFIZIKA in Russian No 84, "Nedra," 1976, pp 178-185, "Numerical Models for the Interpolation of Magnetic and Gravitational Anomalies"]

[Text] The article describes a method for constructing numerical interpolation models for the restoration (interpolation) of magnetic and gravitational anomalies in skipped segments of a profile during observations. It is shown that on those profiles where it is impossible to carry out direct measurements it is possible to use field interpolation in admissible limits.

[276]

DETERMINATION OF GRAVIMETER COMPONENTS FOR MOVING BASE

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1G241

[Article by Ye. N. Bezvesil'naya and S. L. Ryabykin; Moscow, VYCHISL. I PRIKL. MAT. MEZHVED. NAUCH. SB., No 30, 1976, pp 147-153, "Determination of Components of Specific Force of a Gravimeter in the General Case of a Moving Base"]

[Text] The authors give a determination of the components of the specific force of a gravimeter. The derived equations make it possible to determine the structure of a system for obtaining a particular signal for a gravitational anomaly. Bibliography of three items.

[276]

GRAPHIC INTERPRETATION OF MAGNETIC ANOMALIES

Kiev GEOFIZICHESKIY SBORNIK in Russian No 71, 1976 pp 77-88

[Article by K. A. Gura, Kiev University, "Graphic Interpretation of Magnetic Anomalies Over Strata of Finite Strike"]

[Abstract] The proposals set forth in this paper considerably broaden the spectrum of interpreted magnetic anomalies. The anomaly-forming objects are approximated in this case by prismatic bodies with different tilts and different ratios of the dimensions along the coordinate axes. In selecting the interpretation profile it is necessary to use as a point of departure the morphology of the anomalies to be analyzed. An approach from this point of view to a quantitative analysis of the magnetic field makes it necessary to reexamine the correctness of earlier made determinations of the geometry and nature of a number of disturbing objects.

[248]

RECENT MAN-INDUCED MOVEMENTS OF THE EARTH'S CRUST

Moscow IZVESTIYA AKADEMII NAUK SSSR, SERIYA GEOGRAFICHESKAYA in Russian No 12, 1976 pp 135-150

[Article by A. A. Nikonorov, Institute of Physics of the Earth, "Recent Technogenic Movements of the Earth's Crust"]

[Abstract] Technogenic movements, caused by man's activity, can be classified on the basis of the factors giving rise to them. These factors are the following: change in hydrodynamic and hydrostatic conditions in the deep layers in the course of elimination and injection of fluids, influence of its static pressure during rock work, redistribution of static loads at the surface and dynamic effects during explosions. With the withdrawal of fluids and solid rocks from the deep layers there is downwarping of the surface parts of the sedimentary cover and the crust which in large part cannot be considered tectonic. The creation of additional loads during the construction of large cities and the creation of large reservoirs causes a downwarping of the earth's crust by a few tens of centimeters with a rate of about 1 cm/year and also earthquakes with a magnitude up to 5-6. The patterns of manifestation of this type of movements are considered in the examples of three reservoirs: North America (Lake Mead), Africa (Kariba) and Hindustan (Koyna). During underground nuclear shots in Nevada the existing faults are rejuvenated for an extent of hundreds of meters - kilometers for a distance up to 6 km from the site of the shot. Technogenic movements can affect not only the sedimentary cover, but also the consolidated earth's crust.

With respect to their characteristics and also the areas and depths affected in different sectors of the earth's crust, the technogenic movements in some cases do not differ from recent natural tectonic movements, in any case local.

[257]

NATURE OF FAULTS IN NORTHEASTERN PACIFIC OCEAN

Novosibirsk GEOLOGIYA I GEOFIZIKA in Russian No 11, 1976 pp 73-84

[Article by I. A. Solov'yeva, Geological Institute USSR Academy of Sciences, "Nature of Faults in the Northeastern Pacific Ocean"]

[Abstract] A study was made of data from geophysical investigations of the deep structure of the earth's crust in the northeastern basin of the Pacific Ocean and the results of drilling in sectors adjacent to the zones of the largest faults. The nature of the gravitational field, the behavior of the seismic discontinuities and the peculiarities of the geological cross sections contradict the idea of major horizontal displacements occurring along the faults. Considerable depth differences along both sides of the fault zones and the peculiarities of bottom relief are evidence of vertical movements of the sides of the faults with an amplitude up to 1 km or more. The time of movements on the basis of deep drilling data is determined as Quaternary. The displacement of linear magnetic anomalies along the faults remains the only confirmation of the existence of the displacements. However, the nature of these anomalies is not clear and the materials from airborne magnetometer surveys do not agree satisfactorily with deep drilling data.

[251]

DYNAMIC METHOD FOR DETERMINING FIGURE OF GEOID

Moscow IZVESTIYA AKADEMII NAUK SSSR, FIZIKA ZEMLI in Russian No 12, 1976
pp 3-10

[Article by V. L. Danilov, Moscow Institute of Geodetic, Aerial Mapping and Cartographic Engineers, "Dynamic Method for Determining the Figure of the Geoid"]

[Abstract] The problem of determining the figure of the geoid is reduced to the problem of finding the stationary asymptotic behavior of solution of the Cauchy problem for a functional equation of a special type with adherence to some condition of the Poincaré equation type. The condition is solved relative to a linear value -- the radius of a Newtonian sphere, for which the cube roots of the equation were determined. It is shown that the Poincaré condition ensures uniqueness of the solution, if it exists. Use of the Poincaré condition in transformed form makes it possible to formulate the problem more simply and conveniently from the point of view of a numerical realization of the solution. Also considered is the problem of the existence of the sought-for stationary asymptotic behavior in the adopted reckoning system related to the body. It is shown using the concept of density of a body of zero external potential that the condition of existence of a stationary asymptotic behavior is satisfied when selecting the origin of reckoning on the axis of rotation.

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CRUSTAL DEFORMATIONS IN SURKHOBISKIY FAULT REGION

Moscow IZVESTIYA AKADEMII NAUK SSSR, FIZIKA ZEMLI in Russian No 12, 1976
pp 26-37

[Article by I. L. Nersesov, L. A. Latynina, T. V. Gusevà, N. A. Zharinov and A. A. Khobot'ko, Institute of Physics of the Earth, "Crustal Deformations in the Zone of the Surkhobiskiy Fault"]

[Abstract] The paper is on deformation of the earth's crust, measured at Sari-Pul' station, situated in one of the active sectors of the Surkhobiskiy deep fault. The motion was registered by means of repeated geometric leveling and also continuously in time using quartz deformographs and hydrostatic tiltmeters. The determined rates of vertical and horizontal deformations exceed by two orders of magnitude the rates in unimpaired sectors of the earth's crust and are 10^{-3} for the vertical component and more than $5 \cdot 10^{-5}$ for the horizontal component. The nature of the distribution of vertical and horizontal deformations on the observation profile is identical. The compression of the rock noted in the zone of the Surkhobiskiy fault corresponds to tectonic concepts on the compression of

the Garm region and agrees with geodetic data on the convergence of the sides of the Surkhobskiy fault and also with data from the network of deformographic stations in the Garm region registering rock compression over a period of years.

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GRAVITATIONAL INSTABILITY AND DEVELOPMENT OF STRUCTURE OF CONTINENTS

Moscow IZVESTIYA AKADEMII NAUK SSSR, FIZIKI ZEMLI in Russian No 1, 1977
pp 53-64

[Article by V. V. Belousov, Institute of Physics of the Earth, "Gravitational Instability and Development of Structure of the Continents (Attempts at a Synthesis)"]

[Text] The development of the structure of the continents in all its expressions and in all its stages can be considered in relation to the phenomenon of gravitational instability as the basic reason for endogenous processes. The gravitational instability at the general scale of the earth arises in the process of both the initial accumulation of protoplanetary material and in subsequent changes in its phase state. Such changes occur as a result of heating of the earth's interior, primarily under the influence of radioactive decay. Gravitational instability arises at different levels within the earth's sphere and at different scales. An important instability level is the asthenosphere. Near the surface instability arises on a small scale in the course of sedimentation and as a secondary result of tectonic movements. The article in qualitative form sets forth a general model of processes in the earth associated with gravitational instability. Only individual parts of this model can be regarded as sound; the others remain hypothetical. By introducing the latter, the author has endeavored to give the most logically integrated picture. The latter can serve as a program for further research.

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REVIEW OF GEOMAGNETIC PULSATIONS

Moscow IZVESTIYA AKADEMII NAUK SSSR, FIZIKA ZEMLI in Russian No 1, 1977
pp 70-72

[Article by V. A. Troitskaya, Institute of Physics of the Earth, "Geomagnetic Pulsations"]

[Abstract] This paper is a brief review of the principal directions in the development of concepts concerning geomagnetic pulsations, the systematic study of which was initiated at the Institute of Physics of the Earth under the direction of A. N. Tikhonov. The results indicated that pulsations of the geomagnetic field reflect the development of large-scale processes in circumterrestrial space. The properties of pulsations can be used in effective and economic methods for tracing processes in circumterrestrial space -- in the so-called surface diagnosis of the state of near space. Detailed morphological and theoretical investigations made it possible to refine the primary structure and nature of propagation of pulsations along the earth's surface. These results are of fundamental importance for the development of refined methods in magnetotelluric sounding.

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NATURE OF WAVES REGISTERED ON VERTICAL PROFILES

Kiev GEOFIZICHESKIY SBORNIK in Russian No 72, 1976 pp 3-17

[Article by A. M. Yelinat'yeva and O. G. Popova, Institute of Physics of the Earth, "Use of Theoretical Computations for Refining the Nature of Waves Registered on Vertical Profiles from a Source (in the Neighborhood of the Pripyatskiy Downwarp)"]

[Abstract] The authors made theoretical computations of vertical travel-time curves and amplitude curves for objects with thick refracting layers in the Pripyatskiy downwarp. It is shown by computations that in the case of remote sources reflected waves from discontinuities within the salt and from the bottom of the salt come close to the first waves (head and transmitted) associated with thick salt layers; in the remote zones the intensity of the reflected waves becomes predominant. The computations are compared with the experimental results. The suitability of approximate theoretical computations for an analysis of vertical profiling data in media with thick layers is demonstrated. The results of this and other studies make it possible to conclude that a combination of methods -- the refracted waves correlation method, vertical seismic profiling at various distances from shot points, acoustic logging and theoretical calculations -- allow an unambiguous solution of the problem of determining the nature of waves in the correlation method of refracted waves.

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THREE-DIMENSIONAL MODEL OF MAGNETIZED GEOLOGICAL BODIES

Kiev GEOFIZICHESKIY SBORNIK in Russian No 72, 1976 pp 76-81

[Article by M. S. Zeygel'man and K. A. Korenevich, Geophysical Institute Ukrainian Academy of Sciences, "Method for Constructing Volumetric Model of Magnetized Geological Bodies for Interpreting Magnetic Anomalies"]

[Abstract] The article describes a method for constructing a three-dimensional model of magnetized geological objects. The model is formed from standard (investigated earlier in detail) approximating elements. After selecting the number and arrangement of approximating elements the authors carry out an evaluation of the parameters of the observed field. It is proposed that for models formed from a set of elements as described that the problem of evaluating the parameters be solved jointly with the problem of field separation (successive approximations method). The effectiveness of the proposed method is demonstrated in the example of interpretation of the Turbovskaya magnetic anomaly. As a result of the interpretation it was possible to outline the principal regions of perturbing masses; it was established that the anomaly is associated with increased concentrations of ferromagnetic minerals and is promising for a search for magnetite mineralization.

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METHOD FOR DETERMINING THRESHOLD CONDITIONS FOR HIGH SEISMIC DANGER

Kiev GEOFIZICHESKIY SBORNIK in Russian No 71, 1976 pp 19-28

[Article by A. A. Borisov, All-Union Scientific Research Institute of Geophysical Prospecting Methods, "Determination of Threshold Conditions for High Seismic Danger by a Formalized Analysis of Geophysical Data"]

[Abstract] The author has formulated multicriterial geophysical characteristics -- vectors -- for more than 100 zones into which the territory of the orogenic zone of the southern USSR is subdivided. It was found that the values of many geophysical parameters are correlated with a series of characteristics of the seismic regime and thus are indicators of seismic danger. However, there is not one parameter-indicator characteristic of all highly seismic zones and not one zone concentrating all the parameter-indicators. A high percentage of the seismic zones is characterized by 1/2 to 3/4 of the total number of parameter-indicators of high seismicity in a particular region. The multidimensional geophysical vectors of the zones were transformed into one-dimensional characteristics generalizing them -- into a geophysical 10-unit synthetic S-parameter. It has the value of the "similarity measure" for a particular zone with standard highly seismic zones. Despite the great differences in the geophysical characteristics of highly seismic zones, they are expressed by close S units equal to VIII-X units. Accordingly, on this basis a criterion has been formulated which can be used in showing that threshold conditions of high seismic danger have been attained.

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V. UPPER ATMOSPHERE AND SPACE RESEARCH

News

TASS ANNOUNCES LAUNCHING OF "KOSMOS-888"

Moscow PRAVDA in Russian 7 Jan 77 p 2

[TASS Report: "Kosmos-888"]

[Abstract] The artificial earth satellite "Kosmos-888" was launched in the Soviet Union on 6 January 1977. The satellite was inserted into an orbit with the following parameters:

- initial period, 89.5 minutes;
- apogee, 346 kilometers;
- perigee, 178 kilometers;
- orbital inclination, 65 degrees.

NEW "ORBITA" GROUND STATION IN CHUKOTKA

Moscow IZVESTIYA in Russian 16 Jan 77 p 2

[Article by A. Baryshnilov: "Chukotskiy 'Orbitas'"]

[Text] Bukhta Provideniya. (Chukotskiy National Okrug). The fourth "Orbita" ground station in Chukotka has begun operation here. The inhabitants of the settlement are able to watch direct television broadcasts from Moscow.

Television screens have also lit up in the nomad camps of reindeer breeders and in the homes of hunters. More than 60% of the inhabitants of the remote okrug have televisions in their homes. [5]

TASS ANNOUNCES LAUNCHING OF "KOSMOS-889"

Moscow PRAVDA in Russian 21 Jan 77, page not given

[TASS Report: "'Kosmos-889'"]

[Abstract] The artificial earth satellite "Kosmos-889" was launched in the Soviet Union on 20 January 1977. The satellite was inserted into an orbit with the following parameters:

- initial period, 89.8 minutes;
- apogee, 353 kilometers;
- perigee, 210 kilometers;
- orbital inclination, 71.4 degrees.

The satellite carries a radio transmitter operating on a frequency of 19.995 MHz.

TASS ANNOUNCES LAUNCHING OF "KOSMOS-890"

Moscow PRAVDA in Russian 22 Jan 77 p 2

[TASS Report: "'Kosmos-890'"]

[Abstract] The artificial earth satellite "Kosmos-890" was launched in the Soviet Union on 20 January 1977. The satellite was inserted into an orbit with the following parameters:

- initial period, 105 minutes;
- apogee, 1,032 kilometers;
- perigee, 1,000 kilometers;
- orbital inclination, 83 degrees.

FRENCH SCIENTISTS TO STUDY "LUNA-24" SOIL SAMPLES

Moscow PRAVDA in Russian 11 Feb 77 p 3

[TASS Report: "Lunar Soil for French Scientists"]

[Text] On 10 February lunar soil samples transported to earth from the "Luna-24" automatic station were presented to French researchers in Moscow. The director of the Institute of Geochemistry and Analytical Chemistry of the USSR Academy of Sciences, Corresponding Member of the USSR Academy of Sciences V. L. Barsukov, presented a capsule containing samples to a representative of Paris University, Professor K. Allegre. The transferred lunar rock samples will be studied in French scientific laboratories. [5]

TASS ANNOUNCES "SALYUT-5" COMPLETES 3,419 REVOLUTIONS

Moscow PRAVDA in Russian 22 Jan 77 p 2

[TASS Report: "'Salyut-5': Seven Months of Flight"]

[Text] Flight Control Center, 21 January. The orbital research station "Salyut-5," which was launched into near-earth orbit on 22 June 1976, is continuing its controlled flight in an automatic mode with a constant orientation on the earth.

By 1200 hours Moscow time on 21 January 1977 the station had completed 3,419 revolutions around the earth.

After corrections of the flight trajectory carried out on 14 and 18 January, the station's orbital parameters are:

- apogee, 275 kilometers;
- perigee, 256 kilometers;
- period of revolution, 89.6 minutes;
- orbital inclination, 51.6 degrees.

In accordance with the work program, scientific research continues on board the station. Using a telescope-spectrometer the characteristics of IR radiation of the upper atmosphere and the surface of the earth are being studied. Tests of on-board systems under conditions of long space flight are continuing.

All on-board systems, equipment and scientific apparatus of the "Salyut-5" station are operating normally. Throughout the entire flight conditions which are close to those of the earth are being maintained in the compartments: atmospheric pressure of 830-840 mm Hg and a temperature of 21-23 degrees Centigrade.

Incoming information is being processed.

The flight of the "Salyut-5" station continues. [5]

TASS ANNOUNCES LAUNCHING OF "SOYUZ-24"

Moscow PRAVDA in Russian 8 Feb 77 p 1

[TASS Report: "'Soyuz-24' Ship in Orbit"]

[Text] On 7 February 1977 at 1912 hours Moscow time the "Soyuz-24" space-ship was launched in the Soviet Union. The ship is piloted by a crew consisting of flight commander, Hero of the Soviet Union, USSR Cosmonaut

Colonel Viktor Vasil'yevich Gorbatko and flight engineer Lieutenant Colonel Yuriy Nikolayevich Glazkov.

The purpose of the launching of the "Soyuz-24" ship is to continue scientific-technical studies and experiments with the orbital research station "Salyut-5," which began on 7 July 1976 during the joint flight of the transport ship "Soyuz-21" and the "Salyut-5" station.

The on-board systems of the "Soyuz-24" ship are functioning normally and the crew feels well.

Cosmonauts Gorbatko and Glazkov have started fulfilling their flight program. [5]

"SOYUZ-24" DOCKS WITH "SALYUT-5" ORBITAL STATION

Moscow PRAVDA in Russian 9 Feb 77 p 1

[TASS Report: "'Soyuz-24' and 'Salyut-5' Have Docked"]

[Text] On 8 February 1977 the "Soyuz-24" transport ship docked with the "Salyut-5" orbital station which has been in automatic flight since 24 August 1976.

The process of approach and docking of the space vehicles was performed in two stages. In the first stage the "Soyuz-24" ship approached the "Salyut-5" station up to a distance of 80 meters in an automatic control mode. Subsequent approach was performed by the ship's crew manually.

After the "Soyuz-24" ship moored with the "Salyut-5" station the vehicles mechanically docked and their electrical communications were linked.

Cosmonauts V. V. Gorbatko and Yu. N. Glazov are continuing work in accordance with the planned program. The cosmonauts feel well.

Flight Control Center, 8 February. By 1300 hours Moscow time on 8 February the "Soyuz-24" spaceship had completed 12 revolutions around the earth.

The working day of cosmonauts V. V. Gorbatko and Yu. N. Glazkov began at 1130 hours. Speaking in a scheduled communication session, the flight commander said that the crew was carrying out the planned flight program.

After a correction of the flight trajectory, which was performed on 8 February, the orbital parameters of the "Soyuz-24" ship are:

- apogee, 281 kilometers;
- perigee, 218 kilometers;
- period of revolution, 89.2 minutes;
- orbital inclination, 51.6 degrees.

According to the crew's reports and telemetric data, the ship's on-board systems are functioning normally. Cosmonauts Viktor Gorbatko and Yuriy Glazkov are feeling well. [5]

"SOYUZ-24" CREW BOARDS "SALYUT-5" STATION

Moscow PRAVDA in Russian 10 Feb 77 p 1

[TASS Report: "On Board the 'Salyut-5'"]

[Text] On 9 February 1977 at 0846 hours Moscow time the Cosmonauts V. V. Gorbatko and Yu. N. Glazkov, after resting and carrying out preparatory work, crossed over from the "Soyuz-24" spaceship into the "Salyut-5" orbiting scientific station.

The work program on board the "Salyut-5" manned research station provides for a continuation of studies and experiments performed during the flight of the first crew on the station.

Studies of the earth's surface and atmosphere, technical experiments, biochemical studies and tests of on-board systems and the station's equipment will be performed during the flight.

Cosmonauts Gorbatko and Glazkov have started carrying out the flight program on board the manned "Salyut-5" orbiting station. [5]

TASS ANNOUNCES LAUNCHING OF "KOSMOS-892"

Moscow PRAVDA in Russian 10 Feb 77 p 2

[TASS Report: "Kosmos-892"]

[Abstract] The artificial earth satellite "Kosmos-892" was launched in the Soviet Union on 9 February 1977. The satellite was inserted into an orbit with the following parameters:

-- initial period, 90.4 minutes;
-- apogee, 454 kilometers;
-- perigee, 170 kilometers;
-- orbital inclination, 72.9 degrees.

REPORT ON ACTIVITY OF "SOYUZ-24" COSMONAUTS

Moscow PRAVDA in Russian 11 Feb 77 p 1

[TASS Report: "'Salyut-5': The Flight Continues"]

[Text] Flight Control Center, 10 February. Cosmonauts V. V. Gorbatko and Yu. N. Glazkov are reactivating the "Salyut-5" station and checking its on-board systems and scientific equipment. The cosmonauts are also transferring materials necessary for experiments from the transport ship to the station. This morning both crew members took blood samples and stored them for subsequent laboratory biochemical analysis on earth.

Physical training and medical studies will be continued in the afternoon.

Gorbatko and Glazkov feel well. The on-board systems of the orbital station are functioning normally. The parameters of the microclimate are: temperature -- 21 degrees Centigrade, pressure -- 785 mm Hg.

The flight of the "Salyut-5" station continues. [5]

TASS ANNOUNCES LAUNCHING OF "METEOR-2" WEATHER SATELLITE

Moscow PRAVDA in Russian 8 Jan 77 p 2

[TASS Report: "'Meteor-2'"]

[Text] In accordance with the program for further development of a meteorological system using artificial earth satellites, on 7 January 1977 a "Meteor-2" weather satellite with improved on-board apparatus was launched in the Soviet Union.

The "Meteor-2" satellite was inserted into an orbit with the following parameters:

-- initial period of revolution, 103 minutes;
-- apogee, 932.1 kilometers;
-- perigee, 892.9 kilometers;
-- orbital inclination, 81.3 degrees.

The satellite carries an experimental optomechanical scanning television apparatus operating in the visible section of the spectrum to obtain global images of cloud cover and the underlying surface, an experimental optico-mechanical scanning television apparatus operating in a direct transmission mode for images of cloud cover and the underlying surface, an experimental optico-mechanical scanning television apparatus operating in the infrared section of the spectrum to obtain global images of cloud cover and the underlying surface on the illuminated and shaded sides of the earth and a complex of radiometric apparatus intended for continuous observations of streams of penetrating radiation in near-earth space.

In addition to the scientific apparatus the satellite has a precise electromechanical triaxial system for orienting the satellite toward the earth, an electrical supply system with independent aiming and tracking of the solar cells on the sun, a radiotelemetry system for transmitting to earth data on the satellite servo systems, a radio system for precise measurement of orbital parameters and a radio complex for transmitting scientific information to earth.

The apparatus on the "Meteor-2" satellite is operating normally. The command and measurement complex is controlling the satellite. Information from the "Meteor-2" satellite will go for processing and use to the USSR Hydrometeorological Center and the State Scientific Research Center for Study of the Environment and Natural Resources of the Earth. [4]

SHATALOV COMMENTS ON WORK OF COSMONAUTS

Moscow PRAVDA in Russian 9 Feb 77 p 1

[Article by A. Pokrovskiy: "Into Space and to Work"]

[Excerpt] Airforce Lt. Gen. V. A. Shatalov was asked to comment on the tasks and activity of the cosmonauts in this part of their near-earth flight. Here is a short summary of his commentary.

The tasks are completely comparable to the activities of each person who begins his own workday. The total productivity of his labor depends on how he is able from the very beginning to organize his own work area and plan his time. V. Gorbatko and Yu. Glazkov are faced with similar problems. Only one must take into account that they are working under difficult conditions, their "workday" is very long and the program is extensive. This means that they must devote more care to the preliminary period. The cosmonauts work accurately, confidently and in coordination. They have completed all of the work planned for the first hours. They have successfully carried out an orbital correction. The good ground training and experience of both

cosmonauts have paid off. It is known that this is the second flight for V. Gorbakko and Yu. Glazkov has worked for a fairly long time at the cosmodrome and at the Control Center. And of course everyone who is now at the Control Center is trying to help the cosmonauts. If you listen to the communications sessions you understand how the work is conducted in such an efficient businesslike manner and how the earth and the cosmonauts understand each other immediately.

In the corridors of the Center the red display boards light up: "Attention! Communication session!" And after a few seconds we hear the calm voices of Gorbakko and Glazkov in the loudspeakers. There is an exchange of reports, advice and greetings. Work proceeds. From the window of our room we can see how the antenna dishes slowly turn to follow the movement of the "Soyuz-24" and with their huge hands they pass the ship to the next station. The flight continues. [5]

"SOYUZ-24" COSMONAUTS BEGIN THIRD DAY ON "SALYUT-5" STATION

Moscow PRAVDA in Russian 12 Feb 77 p 1

[TASS Report: "'Salyut-5': Work According to Program"]

[Text] Flight Control Center, 11 February. Cosmonauts Viktor Gorbakko and Yury Glazkov began their third workday at 0800 hours on the "Salyut-5" orbital research station. They continued operations for reactivation of the station, checking on-board equipment and scientific instruments, and adjusting the individual units of the station.

At the end of the previous day the crew completed a medical experiment to determine the threshold sensitivity of the vestibular apparatus to electric stimuli under weightlessness conditions. The results of these measurements will be used specifically to improve further the methods for the selection and training of cosmonauts.

Training was carried out using various types of physical loads and the body mass of both cosmonauts was measured using a mass meter.

Planned biological experiments were started.

According to data from telemetric channels and reports by the crew, the cosmonauts feel well. Work in near-earth orbit is successfully being carried out. [5]

TASS ANNOUNCES LAUNCHING OF "MOLNIYA-2" COMMUNICATIONS SATELLITE

Moscow PRAVDA in Russian 13 Feb 77 p 2

[TASS Report: "Molniya-2"]

[Text] In accordance with the program for further development of communication systems using artificial earth satellites, on 11 February 1977 a "Molniya-2" communications satellite was launched from the Soviet Union into a high elliptical orbit. The satellite has an on-board repeater apparatus providing for operation of the system in the centimeter wave range.

The "Molniya-2" communications satellite is intended for operation in the system of long-range telephone and telegraph radio communication in the Soviet Union, for scheduled transmission of USSR Central Television programs to points in the "Orbita" network and for international cooperation.

The satellite was inserted into an orbit with the following parameters:

- apogee, 40,757 kilometers in the northern hemisphere;
- perigee, 493 kilometers in the southern hemisphere;
- period of revolution, 12 hours 15 minutes;
- orbital inclination, 62.5 degrees.

In addition to apparatus for transmission of television programs and for providing long-range multichannel radio communication, the satellite carries a command and measurement complex and also systems for orientation, orbital correction and power supply for the satellite.

Communication sessions using the "Molniya-2" satellite will be conducted in accordance with the planned program. [5]

"SOYUZ-24" COSMONAUTS CONTINUE WORK ON BOARD "SALYUT-5" STATION

Moscow PRAVDA in Russian 13 Feb 77 p 1

[TASS Report: "Work in Orbit"]

[Text] Flight Control Center, 12 February. Cosmonauts Viktor Gorbatko and Yuriy Glazkov are continuing their work on board the "Salyut-5" station.

To build up experience in scheduled operations under spaceflight conditions and to expand the possibilities of performing scientific investigations, the cosmonauts have successfully completed operations to restore the functioning of one of the on-board computers and have replaced individual assemblies and units of other systems of the station.

One of the biological experiments has been completed: sprouted *Crepis* seeds have been fixed for subsequent genetic studies on earth. Similar seeds and their sprouts which have been on the station since the beginning of its flight will be returned in other biological fixing agents. In addition, experiments with fungi and fish roe are continuing.

Both cosmonauts are feeling well. Studies in near-earth orbit are continuing. [4]

"SALYUT-4" STATION MISSION BROUGHT TO END

Moscow PRAVDA in Russian 4 Feb 77 p 2

[TASS Report: "'Salyut-4': The Flight is Completed"]

[Text] Flight Control Center, 3 February. The long space flight of the "Salyut-4" orbital scientific station has ended.

As was already reported, the station was put into near-earth orbit on 26 December 1974. During its active existence, two expeditions of cosmonauts worked on the station for a total duration of 93 days. A three-month joint flight of the station with the unmanned "Soyuz-20" spaceship also took place.

By two o'clock Moscow time on 3 February the station had completed 12,188 revolutions around the earth. In accordance with the flight program, after carrying out its final operations the "Salyut-4" station, on command from the earth, was oriented in space and at the calculated time its engine was fired. As a result of the braking, the station moved into a descent trajectory, entered the dense layers of the atmosphere above the target area of the Pacific Ocean and ceased to exist.

The basic part of the research program was completed early during the month when cosmonauts Gubarev and Grechko worked on board the station, and also during the two-month expedition of Klimuk and Sevast'yanov. The cosmonauts performed investigations of the sun, stars and planets within a broad range of the spectrum of electromagnetic radiation, they performed multipurpose surveying of the territory of the Soviet Union in the middle and southern latitudes, and obtained a significant amount of scientific information on physical processes in the earth's atmosphere and in space.

During the station's flight, technical experiments were performed to test and develop new systems, instruments and units of promising spacecraft. An extensive program of medical and biological research was also carried out. A complete set of scientific and technical experiments was completed during the station's automatic flight.

The flight of the "Salyut-4" station, which lasted more than two years, permitted extensive work in many fields of science and technology. In that period more than 300 scientific and technical experiments were performed in manned and automatic modes of the station.

Throughout the entire flight, the on-board systems of the "Salyut-4" station functioned normally.

The results obtained are of great importance and are being successfully applied in the interests of the economy, science and the further development of space technology. [5]

TASS ANNOUNCES LAUNCHING OF "KOSMOS-891"

Moscow PRAVDA in Russian 3 Feb 77 p 1

[TASS Report: "'Kosmos-891'"]

[Abstract] The artificial earth satellite "Kosmos-891" was launched in the Soviet Union on 2 February 1977. The satellite was inserted into an orbit with the following parameters:

- initial period, 94.4 minutes;
- apogee, 518 kilometers;
- perigee, 466 kilometers;
- orbital inclination, 65.8 degrees.

"SALYUT-5" COSMONAUTS COMPLETE FIRST HALF OF PROGRAM

Moscow PRAVDA in Russian 17 Feb 77 p 1

[TASS Report: "'Salyut-5': Working Days"]

[Text] Flight Control Center, 16 February. The first half of the planned program of operations by cosmonauts Viktor Gorbatko and Yuriy Glazkov on the "Salyut-5" orbital scientific station has been concluded.

The crew is continuing to carry out the program of scientific-technical and biomedical studies and experiments.

A new technological experiment has been initiated: a study of features of the diffusion of substances during weightlessness. The device in which the experiment is conducted is a heated case containing dibenzyl and tolane, the organic substances being studied. The results of the experiment will be compared with data from similar ground experiments and will be used for

further study of the properties of composition, in particular, semiconductor materials.

As part of the program of medical experiments the cosmonauts performed a cycle of studies of the cardiovascular system using the vacuum chamber to simulate the effect of gravity. In addition, they are continuing physical exercises on the multipurpose trainer with simultaneous recording of functional and physiological parameters.

The on-board systems of the "Salyut-5" station are operating normally. The research program is being carried out successfully. [4]

TASS ANNOUNCES LAUNCHING OF "KOSMOS-893"

Moscow PRAVDA in Russian 16 Feb 77 p 1

[TASS Report: "'Kosmos-893'"]

[Abstract] The artificial earth satellite "Kosmos-893" was launched in the Soviet Union on 15 February 1977. The satellite was inserted into an orbit with the following parameters:

- initial period, 105.25 minutes;
- apogee, 1,703 kilometers;
- perigee, 341 kilometers;
- orbital inclination, 74 degrees.

"SALYUT-5" COSMONAUTS PREPARING FOR DESCENT

Moscow PRAVDA in Russian 24 Feb 77 p 1

[TASS Report: "'Salyut-5': Before the Return"]

[Text] Flight Control Center, 23 February. Cosmonauts Viktor Gorbatko and Yuriy Glazkov have completed the planned program of scientific and technical studies aboard the "Salyut-5" station.

On 22 February a series of spectral surveys of the earth's surface and the atmosphere was performed. The data obtained will be used to refine the spectral characteristics of various types of natural formations and to evaluate aerosol and other components of the earth's atmosphere.

Today the crew members are carrying out operations to transfer the station to an automatic flight mode and they are preparing the transport ship for undocking and landing. Materials from the studies performed during the

flight are being transferred to the transport ship. According to reports from the crew and telemetry data, comrades Gorbatko and Glazkov are in good health and are feeling well.

The on-board systems of the transport ship and the "Salyut-5" station are operating normally. The crew is preparing for the return to the earth [4]

TASS REPORTS FINAL ORBITAL PARAMETERS FOR "SALYUT-5" BEFORE DESCENT

Moscow PRAVDA in Russian 25 Feb 77 p 1

[TASS Report: "'Salyut-5': Orbit After Orbit"]

[Text] Flight Control Center, 24 February. The flight of the "Salyut-5" scientific station continues. At the present time the station's orbital parameters are the following:

- apogee, 269 kilometers;
- perigee, 248 kilometers;
- orbital inclination, 51.6 degrees;
- period of revolution, 89.5 minutes.

In the course of the last workday, in accordance with the program, cosmonauts Viktor Gorbatko and Yuriy Glazkov are continuing operations to prepare the on-board systems, equipment and scientific instruments of the station for flight in an automatic mode.

According to medical monitoring data and reports from the station, the state of health of the crew members is good and they are feeling well.

The on-board systems of the station and the transport ship are operating normally. [4]

TASS REPORTS LANDING OF "SOYUZ-24" CREW

Moscow PRAVDA in Russian 26 Feb 77 p 1

[TASS Report: "The Program Has Been Carried Out Successfully"]

[Text] On 25 February 1977, after successfully completing the program of operations aboard the "Salyut-5" orbital scientific station, cosmonauts Viktor Vasil'yevich Gorbatko and Yuriy Nikolayevich Glazkov returned to earth.

The descent vehicle of the "Soyuz-24" transport ship soft-landed in the planned region of the territory of the Soviet Union thirty-six kilometers northeast of the city of Arkalyk.

The cosmonauts felt well after the landing.

The planned program of research of the two expeditions on the "Salyut-5" orbital scientific station has been successfully concluded.

The results obtained from the scientific studies performed in near-earth orbit by the two crews of cosmonauts will be utilized in the interests of the national economy, science and technology and also in the creation of new space vehicles.

The "Salyut-5" station is continuing in controlled flight in an automatic mode. [4]

TASS REPORT ON TENTH DAY OF "SALYUT-5" FLIGHT

Moscow PRAVDA in Russian 19 Feb 77 p 1

[TASS Report: "'Salyut-5': Flight According to Program"]

[Text] Flight Control Center, 18 February. Viktor Gorbatko and Yuriy Glazkov have been working for ten days now aboard the "Salyut-5" orbital scientific station carrying out a varied program of research and technical experiments.

A cycle of experiments has been performed using the IR telescope spectrometer to determine the transparency of the upper layers of the earth's atmosphere in order to study elementary processes occurring within it. In particular, measurements were made of the spectral characteristics of water vapor, ozone and nitrogen oxide. Measurements were made in a wide range of the IR spectrum over various oceanic and continental regions of the planet.

The technological experiment to study features of crystallization and diffusion of molten substances (dibenzyl and tolane) under weightlessness conditions has been completed. The samples obtained will be returned to the earth for laboratory studies.

According to telemetry information and reports from the crew, the cosmonauts are in good health and are feeling well. The on-board systems are operating normally. Microclimate parameters in the station's compartments are: temperature, 22°C, pressure 780 mm Hg.

The flight of the "Salyut-5" orbital station continues. [4]

"SALYUT-5" COSMONAUTS PERFORM MEDICAL STUDIES

Moscow PRAVDA in Russian 20 Feb 77 p 1

[TASS Report: "'Salyut-5': A Day of Medical Studies"]

[Text] Flight Control Center, 19 February. The manned flight of the "Salyut-5" orbital scientific station is continuing.

A large part of the program of the latest workday of the cosmonauts Viktor Gorbatko and Yuriy Glazkov was devoted to medical experiments. The cosmonauts performed a cycle of functional tests while at rest and with measured amounts of physical load on the multipurpose trainer which includes a system of shock absorbers, muscle exercisers and a running track. The condition of the cardiovascular system was studied using the vacuum chamber to simulate the effect of gravity. To record the medical parameters the multifunctional "Polinom-2M" apparatus was used, as well as an independent instrument which measures frequency and depth of respiration, vital capacity of the lungs and pulmonary ventilation.

In addition, an experiment was performed to determine the threshold sensitivity of the vestibular apparatus to electrical stimuli under weightlessness conditions. The body mass of both crew members was again measured.

The cosmonaut's state of health is good. The commander's heart rate is 76 beats per minute; the flight engineer's is 66 beats per minute. Arterial pressure for both cosmonauts is 120 over 80 mm Hg.

Research on the "Salyut-5" station continues.

"SALYUT-5" COSMONAUTS COMPLETE TWO WEEKS IN SPACE

Moscow PRAVDA in Russian 22 Feb 77 p 1

[TASS Report: "'Salyut-5': Two Weeks in Orbit"]

[Text] Flight Control Center, 21 February. The second week of the space flight of Viktor Gorbatko and Yuriy Glazkov aboard the "Salyut-5" orbital scientific station has ended.

In the course of the last two workdays the cosmonauts have continued performing planned studies and experiments. Tests were continued on the control system in various operating modes and also on the system for regeneration of water from condensed atmospheric moisture. The cosmonauts carried out scheduled sessions of photography of the earth's surface and

atmospheric formations in the interests of science and the national economy. Photography was conducted over regions of the Caucasus, the Caspian depression and the Volga region.

Today during the second half of the day the crew performed an experimental check of a special multifunctional combined system installed on the "Salyut-5" station which is being used for the first time in the history of manned space flights. The system provides, as required, complete or partial replacement of the atmosphere. Tests of this system were successful.

Comrades Gorbatko and Glazkov are feeling well.

The flight of the "Salyut-5" orbital station continues. [4]

TASS ANNOUNCES LAUNCHING OF "KOSMOS-894"

Moscow PRAVDA in Russian 23 Feb 77 p 1

[TASS Report: "'Kosmos-894'"]

[Abstract] The artificial earth satellite "Kosmos-894" was launched in the Soviet Union on 21 February 1977. The satellite was inserted into an orbit with the following parameters:

- initial period, 105.1 minutes;
- apogee, 1,026 kilometers;
- perigee, 988 kilometers;
- orbital inclination, 83 degrees

SCIENTISTS COMPILE CATALOGUE OF BRIGHT STARS

Moscow IZVESTIYA in Russian 3 Feb 77 p 6

[Article by A. Viktorov: "Catalogue of Bright Stars"]

[Text] At the Main Astronomical Observatory in Pulkovo scientists have successfully completed an important stage in the creation of a system of stellar coordinates of the southern hemisphere.

On the basis of more than 500,000 observations of bright stars which were made by expeditions of the Pulkovo Observatory in South America and Australia, astronomers have produced a highly precise catalogue of right ascensions of stars.

Scientists from the Pulkovo and Washington Observatories worked jointly on the preparation of a reference network of stellar coordinates with consultation of the Astronomical Computation Institute in the city of Heidelberg (FRG). [5]

"SALYUT-5" CREW CONCLUDES FIRST WEEK IN SPACE

Moscow PRAVDA in Russian 15 Feb 77 p 1

[TASS Report: "'Salyut-5': The Flight Continues"]

[Text] Flight Control Center, 14 February. Viktor Gorbatko and Yuriy Glazkov, the second crew of the "Salyut-5" orbital scientific station, have been in space for seven days.

The basic part of the program of the two previous workdays was devoted to individual engineering, technical, medical and biological studies and experiments. Scheduled tests were performed on the systems and assemblies of the station in various operational modes. In order to continue study of the growth of crystals under weightlessness conditions the cosmonauts introduced new seed crystals into the potash alum solution and they are monitoring the course of the experiment. The crystals which are formed under weightlessness will be returned to earth for analysis and comparison with similar samples grown under terrestrial conditions and with crystals grown on the "Salyut-5" station while the first crew was aboard.

In the program of medical experiments, functional studies of the cosmonauts were performed in a state of rest and with measured physical loads on a multipurpose trainer.

During the workday the cosmonauts photographed the surface of the earth and atmospheric formations to obtain new information which can be used in different areas of science and the national economy. Then they began performing technological experiments.

In the program of medical investigations they performed a complete electrocardiographic examination using "Polinom" multifunctional equipment.

At the present time the parameters of the "Salyut-5" orbital station are:

- apogee, 274 kilometers;
- perigee, 253 kilometers;
- period of revolution, 89.5 minutes;
- orbital inclination, 51.6 degrees.

Cosmonauts Gorbatko and Glazkov feel well. The flight continues. [5]

REPORT ON "SALYUT-5" STATION

Moscow PRAVDA in Russian 11 Feb 77 p 6

[Article by A. Pokrovskiy: "Everything in Order Aboard"]

[Text] The rhythm of life at the Center is now governed by the motion of an artificial celestial body. Here there are rises and falls in the rhythm. As soon as the "Salyut-5" enters into the zone of radiovisibility the corridors empty out and specialists occupy their work places. Each word of the radio conversations is listened to here attentively and is then carefully analyzed and compared with telemetric data. However, the content of these conversations is accessible to specialists alone because they are conducted for the most part in the language of figures. However, to sum it up, reference is, in particular, to the demothballing of station equipment, its preparation for the implementation of the program of scientific and technical research in a manned flight regime.

But hidden behind these words is the enormous volume of work carried out by V. Gorbatko and Yu. Glazkov. At their disposal is a vehicle with a weight of more than 25 tons and a volume of about 100 cubic meters; it includes thousands of systems, assemblies and instruments. The figures from the communications from the cosmonauts also tell how all the new sectors of the flying observatory are gradually brought into operation.

But after all, the "Salyut-5" is not only a scientific laboratory, but also a residence for V. Gorbatko and Yu. Glazkov. It is a house which for almost a half year has been in autonomous flight under complex space conditions, but during this time an excellent state of the atmosphere was

maintained and there was reliable operation of the entire life support system and other assemblies and instruments aboard the station.

We say "operated" because the station also operated at the time when there was no crew aboard it. There was continuation, in an automatic regime, in the IR spectrum of the underlying surface of the earth, the moon and a number of objects in the Galaxy. Some technological experiments were continued. Photographs were taken of individual regions of our country in the interest of the national economy.

It was necessary to create not only "comfortable" conditions for the operation of the instruments, but also to maintain the station in a regime of constant orientation. The creators of the "Salyut-5" are especially satisfied with the so-called electromechanical stabilization system. A clever device, incorporating a metal sphere, suspended in a magnetic field, makes it possible to maintain a rigorous triaxial orientation of the station, "protecting" it against the influence of the perturbing effects of aerodynamic forces, the pressure of solar rays. And what is very important is that there is virtually no expenditure of the working body; free solar energy is used.

Thus, the "Salyut-5" station is actually universal. Not only with respect to the diversity of the scientific investigations carried out aboard it, but also the possibility of carrying them out in both automatic and manned regimes. And the possibility of changing crews is opening the way to an improvement, supplementing and development of a number of experiments. Indeed, the results of some of them have already been analyzed on the earth, and on this basis, scientists can "order" the cosmonauts to provide additional interesting data.

The "Salyut-5" has been in orbit for the eighth month. It is in a working, operating state. And during such a long time all of its systems have shown a high reliability. A new proof of this is the reports of cosmonauts: "Everything is in order aboard the station!" Clear, purposeful work is proceeding in a new, very important stage in flight of the "Salyut-5" orbital station.

[243]

NEWSPAPERS TRANSMITTED BY SATELLITES

Moscow PRAVDA in Russian 14 Jan 77 p 6

[Article by P. Barashev: "The Lines Fly Through Space"]

[Text] The telephone bell rang in the editorial offices: "This is your reader, engineer Gromov. I have just returned from Khabarovsk. One of my friends there saw an issue of PRAVDA. It was said that it was received via

satellite. We know about the phototelegraph, but now we hear about space... Please tell us about this."

The author of these lines has already had the occasion to write in PRAVDA a report from the shop where newspapers are transmitted by phototelegraph of the Central Telegraph System of the USSR Communications Ministry and tell in detail about how issues of nine central newspapers are dispatched from the capital to different ends of the country via ground cable and radio relay lines and how readers in many regions in Central Asia, Siberia and the Far East learn the news from day to day from the Muscovites.

And here again is the same shop.

However, this room can only be called a shop in an arbitrary sense. Here in place of heavy equipment there are numerous supports of electronic devices, filled with different semiconductors: from here workers send a final product, the mentioned newspaper, over great distances.

"Now I will show where all this began," stated the chief of the shop, Fatima Gubayevna Churyakova, and led us into the next room.

There we saw the "Gazeta-2SK" with the size of a small desk. A great number of "eyes" were scattered over its control panel; under the cover was a spherical camera in which a strip of the new issue of the newspaper is attached.

"Using this apparatus we sent into space issues of PRAVDA, KOMSOMOLSKAYA PRAVDA and SOTSIALISTICHESKAYA INDUSTRIYA when their trial transmission to Khabarovsk was being carried out."

And this is how it was.

An operator attached a copy of a newspaper page in the transmitter chamber and pressed a button. The camera moved from position and a thin ray of light ran along the strip and as it were, 'felt' all the letters, commas and periods. Upon meeting with black printer's ink and then on spaces, the light ray was reflected from them and was transformed using the electronic system into electric pulses which were transmitted along cable channels from here to special substations. There the pulses become radio signals and are then relayed on to a transmitting radio station. And from here the signals were transmitted into space where the "Molniya-3" communications satellite is circling over our planet.

The sensitive "Molniya" antennas after some fractions of a minute detected the signals and instantaneously returned them to the earth, in the direction of Khabarovsk.

The reverse transformation of the radio signal into electric pulses and then into light signals occurred just as instantaneously and then an enormous photographic film, the size of a newspaper page, was sent to the developer. And the photocopy of the strip was ready.

The space flight of the newspaper lines has ended...

"What are the advantages of transmitting newspapers through space?" I asked.

"Enormous. Ground communications make it possible to contact a limited number of cities and require a great amount of equipment and thousands of kilometers of expensive cable," explained the specialists. "Using satellites, in the final perfection of this communication system we can transmit a newspaper to Yakutsk, to Magadan, to Sakhalin... To virtually any point in the country. Via satellite communication channels a newspaper, like television programs, through the 'Orbita' system, can be received simultaneously by many cities. There it is only necessary to set up the appropriate equipment."

The first experimental transmission of newspapers was carried out using communication satellites of the "Molniya" type. Due to the specific peculiarity of the elliptical orbit of the "Molniya" it was necessary to make some additional improvements in the ground equipment.

Subsequent transmissions already passed through the "Raduga" communications satellite, launched into space in September of last year.

The "Raduga" is a satellite of a new type. It is "flying" in a geostationary orbit which ensures its constant positioning relative to a definite point on the earth's surface. This simplified the requirements on the ground transmitting and receiving, final apparatus.

The last experiments revealed that the rate of transmission of newspaper strips via satellites in a number of regions of our country can be increased by a factor of seven in comparison with the rate of transmissions via ordinary lines. For example, at Khabarovsk a newspaper strip passes through the presently existing channel in about 22 minutes, whereas it only takes three minutes to pass through space...

Then they showed me an issue of PRAVDA sent to Khabarovsk through space and printed in Far Eastern print shops. It differed in no way from that which was issued in Moscow. The same clear lines, the same type. Only at the very bottom of the last column, included in the publication data, was there a small device with the inscription: "Kosmos-KhB."

And it also stood out as evidence of new successes of workers in science and production of the Ministry of Communications and as a landmark in the achievements of Soviet space vehicles, which to the list of involved

professions -- meteorologists, radio workers, explorers of the earth's depths and the earth's interior -- have added still another profession.

Today satellites are only becoming acquainted with this profession. But in the anniversary year of 1977, the anniversary year of the October Revolution, they will finally put on their shoulders the task of lightning-quick, not-ever-failing couriers. Couriers for which space is becoming a well-trod road.

[223]

Abstracts of Scientific Articles

MODEL OF OUTER IONOSPHERE

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1A33

[Article by R. V. Gostrem, M. A. Nikitin and L. P. Zakharov; Moscow, FIZ. IONOSFERY. KRATK. SOOBSHCHENIYA, "Nauka," 1976, pp 128-129, "Dynamic Model of the Outer Ionosphere"]

[Text] The authors propose a dynamic model of the outer ionosphere which takes into account the mutual relationships between different regions of the ionosphere. The corresponding system of equations, supplemented by initial and boundary conditions, and also the Jacchia-1971 model of the neutral atmosphere, was used for computing the diurnal variations of the principal parameters of the ionosphere in the range of altitudes from 100 km to the peak of the line of force of the geomagnetic field with $L = 2.0$ under equinoctial conditions of the solar activity minimum. The results of the computations are discussed.

[276]

DYNAMICS OF IONOSPHERIC F REGION

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1976, 1A34

[Article by V. V. Makeyev and V. V. Rybin; Moscow, FIZ. IONOSFERY. KRATK. SOOBSHCHENIYA, "Nauka," 1976, p 126, "Choice of Analytical Models for Describing the Dynamics of the Ionospheric F Region"]

[Text] A correlation has been established between solutions of the diffusion equation for the ionosphere obtained for finite and infinite altitude ranges. The conclusion is drawn that the characteristic behavior of the ionosphere should preferably be described by solutions with a zero flux at infinity. Bibliography of one item.

[276]

EFFECTIVE COLLISIONS IN LOWER IONOSPHERE

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1A60

[Article by V. A. Zelenetskiy and E. G. Mirmovich; Moscow, FIZ. IONOSFERY. KRATK. SOOBSHCHENIYA, "Nauka," 1976, pp 3-4, "Measurement of the Effective Number of Collisions in the Lower Ionosphere"]

[Text] The article describes a method for determining the effective number of collisions in the lower ionosphere by estimating the amplitudes of the magnetoionic components and the Faraday rotation of polarization of a radio signal reflected from not totally dense meteor trails. Also considered is the case of a quasilongitudinal approximation. The authors make estimates of the necessary accuracy in measuring amplitude on the basis of available experimental data on Faraday rotation of the polarization plane of radio waves and the frequency of collisions in the lower ionosphere. Bibliography of four items.

[276]

MODELING OF ARTIFICIAL LUMINESCENT FORMATION

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1A89

[Article by N. V. Kulikova and S. A. Mayev; Moscow, TRUDY IN-TA EKSPERIM. METEOROL. GUGMS, No 5(62), 1976, pp 74-79, "Number of Scatterings of a Photon in the Problem of Numerical Modeling of an Artificial Luminescent Formation of Finite Optical Thickness"]

[Text] The authors have estimated the mean number of scatterings in an artificial luminescent formation (ALF) in the upper atmosphere. This value is necessary in the statistical modeling of the luminescence of an ALF. It was possible to find the mean number of scatterings in a homogeneous sphere of a finite optical thickness τ_0 during pure scattering; using this value it was possible to estimate the number of scatterings in an artificial luminescent formation. Bibliography of 21 items.

[276]

REGISTERING SPECTRA OF ARTIFICIAL LUMINESCENT CLOUDS

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1A95

[Article by O. F. Klyuyev; Moscow, TRUDY IN-TA EKSPERIM. METEOROL. GUGMS, No 5(62), 1976, pp 160-164, "Complex of Instrumentation for Registering Spectra of Artificial Luminescent Clouds"]

[Text] The article describes a complex of instrumentation for observing and registering the spectra of artificial luminescent clouds. The apparatus is designed on the basis of a high-transmission SP-48 spectrograph, a ZEP32 M image converter and a special command unit. The paper illustrates the optical design and operation of the control units. The preliminary results of tests of the instrumentation are presented briefly. Bibliography of two items.

[276]

ENERGY DISTRIBUTION OF IONOSPHERIC ELECTRONS

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1A109

[Article by S. M. Sheronova; Moscow, FIZ. IONOSFERY. KRATK. SOOBSHCHENIYA, "Nauka," 1976, pp 176-177, "Nature of Distribution of Ionospheric Electrons by Energies Along the Orbit of the 'Kosmos-378' Satellite"]

[Text] Using a spherical Langmuir probe the author measured the distribution of electrons by energies in ionospheric plasma. It has been established that at nighttime in the absence of additional sources of heating and leaking fluxes of electrons the distribution of electrons by energies is Maxwellian. In the presence of fluxes of high-energy particles at nighttime in the region of latitudes $\Phi = 45-60^\circ$ there is a sharp increase in temperature to 5000-6000°K and "high temperature" tails appear and sometimes there is destruction of the Maxwellian distribution. In the morning and daytime hours in the presence of a Maxwellian distribution for the main part of the electrons there are almost always "high-temperature tails." Bibliography of two items.

[276]

INVESTIGATION OF INFRARED SPECTRUM OF VENUS

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1A111K

[Preprint by V. I. Gnedikh, V. S. Zhegulev, L. V. Zasova, V. I. Moroz, N. A. Parfent'yev and G. V. Tomashova; Moscow, Preprint Space Research Institute USSR Academy of Sciences, PREDVARITEL'NYYE REZUL'TATY ISSLEDOVANIYA INFRAKRASNOGO SPEKTRA VENERY NA ORBITAL'NYKH APPARATAKH "VENERA-9" I "VENERA-10" (Preliminary Results of Investigation of the IR Spectrum of Venus on the Orbital Vehicles "Venera-9" and "Venera-10"), Preprint Pr-273, 1976, 33 pages]

[Text] The CO_2 absorption bands at about $2\mu\text{m}$ are formed within a scattering cloud medium. The behavior of the absorption bands with a change in the phase angle and the center-edge effect satisfy well a model with scattering and do not agree with a model of simple reflection; the upper boundary of the cloud layer (determined as the level at which the concentration decreases by a factor of e) is situated at an altitude of 65-68 km; the vertical profile of the cloud layer is characterized by a scale height $H_a \approx 3-5$ km; the horizontal profile of the upper boundary at scales 50-100 km or more is very smooth: the variations of its height do not exceed 1-2 km.

[276]

REGISTRY OF INCREASE IN SOLAR COSMIC RAYS

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1A149

[Article by L. A. Darchiyeva, T. A. Ivanova, E. N. Sosnovets and Ye. A. Chuchkov; Tbilisi, SIMPOZ. KAPG PO SOLNECHNO-ZEMN. FIZ., Ch. 1, TEZISY DOKL., 1976, pp 56-58, "Simultaneous Measurements of the Increase in the Fluxes of Solar Cosmic Rays on the Artificial Lunar Satellite 'Luna-22' and the Artificial Earth Satellite 'Kosmos-675'"]

[Text] The author gives the preliminary results of measurements of the increase in fluxes of solar cosmic rays (SCR) in the orbit of an artificial lunar satellite (ALS) in interplanetary space and the artificial earth satellite "Kosmos-675" within the magnetosphere on 10-13 September 1974.

[276]

SPECTRA OF INJECTED ELECTRONS

Moscow REFERATIVNYY ZHURNAL, GEOFIZIKA, SVODNYY TOM in Russian No 1, 1977, 1A180

[Article by P. G. Astakhov, A. S. Besprozvannaya, L. I. Korovina and T. M. Krupitskaya; Moscow, FIZ. IONOSFERY. KRATK. SOOBSHCHENIYA, "Nauka," 1976, pp 156-157, "Determination of the Spectra of Injected Electrons on the Basis of Data from Vertical Sounding of the Ionosphere for South Pole Station"]

[Text] The authors have determined the parameters of the fluxes of injected electrons on the basis of data from ground vertical sounding at the high-latitude station South Pole ($\Phi = 90^\circ\text{S}$; $\Phi_L = 75.4^\circ$) in the winter of 1967. The determined parameters of the fluxes were close in intensity and in the form of the spectra to fluxes of daytime cusp soft electrons measured on the high-latitude Aurora, OGO-4 and ISIS-1 satellites. Bibliography of four items.

[276]

SPECTRAL ZONES FOR MULTIZONAL SPACE SURVEY

Moscow REFERATIVNYY ZHURNAL, 62. ISSLEDOVANIYE KOSMICHESKOGO PROSTRANSTVA, OTDEL'NYY VYPUSK in Russian No 11, 1976, 11.62.111

[Article by V. A. Kottsov, Yu. I. Fivenskiy and Yu. M. Cesnokov; Moscow, MNOGOZONAL'N. AEROKOSMICH. S"YEMKA I YEYE ISPOL'Z. PRI IZUCH. PRIROD. RESURSOV, Moscow University, 1976, pp 15-24, "Substantiation of the Choice of Spectral Zones for a Multizonal Space Survey"]

[Text] The authors examine the principles for optimization of the receiving part of a multizonal survey system using the criterion of the best distinguishability of the registered objects. The system is one of the per centron type. The signatures of the contrasts in spectral characteristics of the objects are used for selecting the spectral survey channels.

[301]

INSTRUMENT FOR OBSERVING BRIGHTNESS OF ARTIFICIAL SPACE OBJECTS

Moscow REFERATIVNYY ZHURNAL, 62. ISSLEDOVANIYE KOSMICHESKOGO PROSTRANSTVA, OTDEL'NYY VYPUSK in Russian No 11, 1976, 11.62.112

[Article by Ye. B. Vovchik and R. F. Fedoriv; --, PROBLEMY KOSMICH. FIZ. MEZHVED. NAUCH. SBORNIK, No 11, 1976, pp 131-135, "Electrophotometer for Observing the Brightness of Artificial Space Objects"]

[Text] The article describes electrophotometers for observing artificial earth satellites and also for studying absorbing and scattering properties of the atmosphere using the reflected light of artificial earth satellites. Emphasis is on an increase in the accuracy of measurements when there is a significant sky background. Bibliography of 11 items.

[301]

POLARITY OF INTERPLANETARY MAGNETIC FIELD

Moscow REFERATIVNYY ZHURNAL, 62. ISSLEDOVANIYE KOSMICHESKOGO PROSTRANSTVA, OTDEL'NYY VYPUSK in Russian No 12, 1976, 12.62.220

[Article by S. M. Mansurov, G. S. Mansurov and L. G. Mansurova; Moscow, ANTARKTIKA. DOKL. KOMIS., No 15, "Nauka," 1976, pp 16-29, "Catalogue of Determinations of Polarity of Sectors of the Interplanetary Magnetic Field During the Period 1957-1974"]

[Text] The article gives determinations for each Greenwich day of the predominant polarity of sectors of the interplanetary magnetic field during the period 1957-1974 made by types of variations of the geomagnetic field at circumpolar stations. Bibliography of 13 items.

[303]

ENERGY SPECTRA OF PARTICLES GENERATED IN FLARES

Moscow REFERATIVNYY ZHURNAL, 62. ISSLEDOVANIYE KOSMICHESKOGO PROSTORANSTVA, OTDEL'NYY VYPUSK in Russian No 12, 1976, 12.62.222

[Article by V. A. Kobzev and Ye. V. Kolomeyets; Alma-Ata, PRIKL. I TEOR. FIZIKA, No 7, 1975, pp 202-204, "Energy Spectra of Particles Generated During Flares During Different Periods of Solar Activity"]

[Text] On the basis of the relative increase in the effect, using data for several stations, it was possible to ascertain the differential energy spectra for protons during the time of large flares on the sun.

[303]

IMPROVEMENT OF AES ORBITAL ELEMENTS

Moscow REFERATIVNYY ZHURNAL, 62. ISSLEDOVANIYE KOSMICHESKOGO PROSTORANSTVA, OTDEL'NYY VYPUSK in Russian No 12, 1976, 12.62.283

[Article by V. A. Kudryavtsev; Leningrad, ULUSHSHENIYE ORBITAL'NYKH ELEMENTOV ISZ (Improvement in the Orbital Elements of an Artificial Earth Satellite), Leningrad Forestry Academy, 1976, 12 pages (Manuscript deposited at the All-Union Institute of Scientific and Technical Information), 20 August 1976, No 3175-76 DEP)]

[Text] The article gives a formulation of the problems involved in improving the orbital elements of both perturbed and unperturbed orbits. The exposition is illustrated by numerous model problems, solved using an electronic computer.

[303]

NONRELATIVISTIC-RELATIVISTIC PLANETARY FLIGHTS

Moscow REFERATIVNYY ZHURNAL, 62. ISSLEDOVANIYE KOSMICHESKOGO PROSTORANSTVA, OTDEL'NYY VYPUSK in Russian No 12, 1976, 12.62.418

[Article by B. K. Fedyushin and S. Ya. Sherbak; Moscow-Leningrad, PROBLEMY PROISKHOZHENIYA TEL SOLNECH. SISTEMY, 1975, pp 302-305, "On the Theory of Nonrelativistic-Relativistic Planetary Flights"]

[Text] The article examines the principles of the theory of planetary flights when motion is with nonrelativistic velocities but relativistic jet forces are used. It is shown that the theory of such planetary flights must be regarded as one of the limiting cases of the theory of relativistic jet vehicles. Bibliography of five items.

[303]

GEOLOGICAL INTERPRETATION OF SPACE PHOTOGRAPHS

Moscow REFERATIVNYY ZHURNAL, 62. ISSLEDOVANIYE KOSMICHESKOGO PROSTRANSTVA, OTDEL'NYY VYPUSK in Russian No 10, 1976, 10.62.204

[Article by D. M. Trofimov, Ya. G. Kats and I. I. Sonin; Moscow, ISSLED. PRIROD. SREDY KOSMICH. SREDSTVAMI. GEOL. I GEOMORFOL., Vol 5, 1976, pp 287-292, "Some Problems in the Geological Information Content of Space Photographs"]

[Text] The information content of photographic images is dependent on the resolution of the survey camera and the photographic materials. Geological information content, on the other hand, is determined by the specific problems facing the information users. The authors describe methods for computing geological information content. Bibliography of 17 items.

[290]

GEOLOGICAL STRUCTURE STUDIED FROM AIR AND SPACE

Moscow REFERATIVNYY ZHURNAL, 62. ISSLEDOVANIYE KOSMICHESKOGO PROSTRANSTVA, OTDEL'NYY VYPUSK in Russian No 10, 1976, 10.62.207

[Article by S. M. Bogorodskiy and L. I. Solov'yev; Moscow, ISSLED. PRIROD. SREDY KOSMICH. SREDSTVAMI. GEOL. I GEOMORFOL., Vol 5, 1976, pp 168-183, "Analysis of the Geological Structure of the Mangyshlak-Ustyurtskiy Region on the Basis of Aerial and Space Surveys at Different Scales"]

[Text] On the basis of small-scale photographs of the territory of the Mangyshlak-Ustyurtskiy region it has been possible to define three regions having different geological structure. The fragments of this geoblock discriminated on the TV space photographs differ not only in the peculiarities of the landscape, but also in the regime of tectonic movements of the earth's crust. The article examines in detail the results of interpretation of space photographs in the limits of the defined structural elements. Bibliography of 11 items.

[290]

VI. MISCELLANEOUS

News

POLAND TO ESTABLISH PERMANENT SCIENTIFIC BASE IN THE ANTARCTIC

Moscow IZVESTIYA in Russian 7 Jan 77 p 1

[Article by N. Yermolovich: "To the Shores of the Antarctic"]

[Text] Poland will be the second socialist state after the Soviet Union to have a permanent scientific base in the Antarctic. A ship will soon set course from Gdynia to the shores of the ice continent with nineteen expedition members and all necessary gear aboard. It has been decided to build the station in the region of the Drake Passage on the Atlantic coast of the Antarctic.

Polish scientists will undertake ecological and biological research on the bioresources of the ocean. The creation of this outpost of Polish oceanologists on the sixth continent has become possible to a significant degree due to the many instances of participation of Polish scientists in the work of Soviet Antarctic expeditions. [4]

SCIENTISTS DEPART FOR ANTARCTIC EXPEDITION

Baku BAKINSKIY RABOCHIY in Russian 26 Jan 77 p 4

[Unsigned article: "On a Course to Antarctica"]

[Text] Yesterday the passenger ship "Estoniya" set out from Riga. On board are more than seventy participants of the 22d Soviet Antarctic expedition and a group of scientists from the GDR who will perform a series of investigations on the ice continent.

Before the departure of the "Estoniya" the chief of the expedition, L. I. Dubrovin, said that their task will be to continue an extensive series of observations in the meteorological center of the station

"Molodezhnaya," at the "Mirnyy" observatory, and at stations "Vostok," "Leningradskaya," "Bellinsgauzen" and "Novolazarevskaya." There will be rocket probing of the atmosphere at altitudes of up to 100 kilometers. Interesting operations will be continued at the "Novolazarevskaya" station. Here a hole will be drilled through the shelf ice to a depth of hundreds of meters for the first time. This will enable scientists to study the sea water under the glacier.

The program of investigations will include joint operations with scientists from East Germany, United States and other countries. [5]

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